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ABSTRACT

Evaluated was the environmental education program conducted at the Tremond Environmental Education Center, Tremond, Tennessee to determine its effectiveness in changing and influencing environmental attitudes and self-concepts of elementary school children. As part of the study, instruments to assess environmental attitudes and attitude change in elementary children were developed and tested. The program conducted at the Tremond Environmental Center may change environmental attitudes, littering habits, and certain self-concept variables. The Environmental Preference Test, an instrument developed by the author and a panel of experts, appears to measure some environmental attitudes and attitude change in fourth- through sixth-grade students. Littering habits can be measured using the Verification Frequency Simulation and can be changed by the environmental program. It was also determined that a relationship may exist between environmental attitudes and the age or ethnic origin of the children. (Author/BB)

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THE EFFECTS OF THE NATIONAL ENVIRONMENTAL EDUCATION DEVELOPMENT (NEED) PROGRAM ON SELF CONCEPT AND CHANGE OF ENVIRONMENTAL ATTITUDES OF SELECTED ELEMENTARY SCHOOL STUDENTS

Robert Williams

by

ROBERT A. WILLIAMS

A DISSERTATION

Presented in Partial Fulfillment of Requirements for the Degree of
Doctor of Philosophy in Educational Administration
Department of Curriculum and Instruction
School of Education, Georgia State University

Atlanta, Georgia

1975

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Robert Aura Williams

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ABSTRACT

THE EFFECTS OF THE NATIONAL ENVIRONMENTAL EDUCATION DEVELOPMENT (NEED) PROGRAM ON SELF CONCEPT AND CHANGE OF ENVIRONMENTAL ATTITUDES OF SELECTED ELEMENTARY SCHOOL STUDENTS

by Robert Aura Williams

Sidney P. Smith, Dissertation Supervisor

Statement of the Problem

The study evaluated the environmental education program conducted at the Tremond Environmental Education Center, Tremont, Tennessee to determine its effectiveness in changing and influencing environmental attitudes and self concepts of elementary school children. As a part of the study, instruments to assess environmental attitudes and attitude change in elementary children were developed and tested.

Methods and Procedures

The subjects were fourth, fifth, and sixth grade students from the metropolitan Atlanta, Georgia and Knoxville, Tennessee areas. The experimental group attended the Tremont Environmental Education Center NEED program while the control group had a similar camping program sponsored by the YMCA and YWCA which was without a specific environmental focus. Both groups were evaluated by three instruments:

1. The Environmental Preference Test (EPT), an instrument developed by the author and a panel of experts, was piloted using fifth and sixth grade students from two Atlanta, Georgia public schools.
2. The Missouri Childrens Picture Series (MCPS) was used to develop self concept variables.

3. The Verification Frequency Simulation (VFS) was used to assess littering habits.

Evaluation for both the experimental and control groups was conducted at the beginning of the week-long session and again at the end. A Solomon Four-group research design was utilized as a basis for group selection. A one-way Analysis of Variance was used to test the ten dependent variables while a t Test was used to analyze gain scores. A biserial correlation was used to determine the association of the tested variables to the seven descriptive variables and a Pearson Product-Moment correlation was computed to ascertain associations between tested variables. Fischer's z-transformation was used to determine relationships between pretest and posttest correlations.

Results

Six hypothesis were generated and the data related to each were presented and analyzed with statistical results indicating that:

1. the NEED program presently conducted at the Tremont Environmental center may significantly change environmental attitudes, littering habits and certain self-concept variables;
2. the EPT does measure some environmental attitudes and attitude changes of fourth, fifth, and sixth grade students;
3. the Tremont Environmental Education program appears to be more successful in changing environmental attitudes than the control YMCA and YWCA camps, as determined by the instruments used in this study;
4. littering habits can be measured using the VFS and can be changed by the Tremont Environmental Education (NEED) program.

The correlational statistics indicated that the EPT scores were correlated with six descriptive variables and not correlated to the VFS or littering habit variable. A change in correlation value as determined by a Fischer's z-transformation was found in the Ethnic Origin variables. A large number of significant correlations were found to exist between the MCPS scales and the descriptive variables, with changes in correlation between pretest and posttest found between all variables and the Ethnic Origin variable. Changes in correlation values between pretest and posttest occurred in the M-F scale with Socio-economic Status variable, Aggressivity scale with the Grade Level variable and the VFS with the sex variable. Correlations between tested variables indicated that a relationship may exist between the scores on the EPT and the MCPS scales for Conformity and Sleep Distrubance and that this relationship remains constant through the Tremont experience.

Conclusions

The results of this study make it possible to conclude that the Tremont Environmental Education (NEED) program is effective in changing environmental attitudes and certain self-concepts of fourth, fifth, and sixth grade students. As a result of the evaluation of the Tremont program these findings emerged:

1. The Environmental Preference Test (EPT) is effective in assessing environmental attitudes of this group of children.
2. The Verification Frequency Simulation (VFS) has significant possibilities for analyzing littering habits of larger populations.
3. No consistent predictor variables for littering habits appeared as a result of this study.
4. A relationship may exist between environmental attitudes as assessed by the EPT and the age or ethnic origin of the children.

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Chapter I

Introduction

Since Earth Day, 1970, there has been a growing concern by American people about negative attitudes towards the environment. This negative attitude has concerned scientists, ecologists and sociologists as well as environmental educators. Many of these scholars have linked the necessity for the development of favorable environmental attitudes by American people with the future survival of the human race.

In the last five years, political and social leaders have emphasized and subsequent reports have continuously stressed the importance of the survival of the environment in a form conducive to man's existence. Congress, expressing its fear for the future, has recently enacted a bill: Public Law 91-516, known as the Environmental Education Act, funded by Public Law 91-665. Presidential emphasis, coupled with the Congressional bill, exemplifies the Federal government's contribution to research efforts in environmental education so that more information will be available for curriculum developers and school administrators to create new programs for attitude development.

The National Education Association (NEA) Research Division (1970) in a survey of programs discovered that environmental education investigations in the past have been involved with setting limits and locating environmental education problems. Most research has been

focused on defining these problems and on descriptive studies; consequently, little information on environmental attitudes has been accumulated. Even though numerous textbooks and programs in environmental education are being written, there is limited research to evaluate these new curricula or texts (Wallace, 1971). Mencsini (1971) stated that future research should attempt to validate and verify the ideas then being proposed in environmental education. This study is concerned with evaluating one of these new curricula: The National Environmental Education Development (NEED) program of the United States National Park Service.

One of the few studies that evaluates environmental education materials is the Education Products Report (1971). This study reported a vast difference between methods used for developing ideas or concepts in environmental education and in other fields such as geology, sociology or botany. One implication of this report was the environmental education materials should be developed on a broad interdisciplinary basis. Not only should developers of environmental education curricula write factual texts and materials, but writers should try to help change values and attitudes (Jordahl, 1970). Almost five hundred years of shortsighted use of American natural resources are being challenged by these new programs (Gillian, 1970).

In the new program, the ultimate goal will be to increase an awareness in the student of his surroundings that will lead to personal involvement (Hawkins, 1970) and a change in his overall behavior towards the environment. William Stapp (1970) has developed a set of guiding principles that should be considered in developing an environmental education program. Central to all of these principles is the generation

of attitudes in the students which will *perpetuate awareness, interest,* and understanding of themselves and their environment. Schoenfeld (1970), in support of a set of national goals for environmental education, placed great emphasis on changing values and attitudes. He was further concerned that environmental education begin early in a child's life, in order that first impressions would be established early and thus wholesale changes in attitudes will not be necessary later in life.

The National Park Service, has begun a nationwide effort to promote awareness of environmental problems. The Service has developed the National Environmental Study Area (NESA) program and the National Environmental Education Development (NEED) program. The National Park Service is so strongly committed to environmental education that every national park in the United States has some environmental studies program; it may be the National Environmental Study Area (NESA) short-term program or the longer National Environmental Education Development (NEED) program. A NEED program study area is located at the Tremont Environmental Education Center, Tremont, Tennessee. The program is sponsored jointly by the National Park Service's Great Smoky Mountains National Park, located in the states of Tennessee and North Carolina, and a private educational institution, Maryville College, Maryville, Tennessee.

Statement of the Problem

This study was undertaken to determine the effectiveness of National Environmental Education Development (NEED) program in changing or influencing environmental attitudes and self-concepts of elementary

school children. The investigator sought answers to the following questions with regard to certain variables:

1. Is there a significant relationship between age and change in attitude scores, self-concept scores and Verification Frequency Simulation?
2. Is there a significant relationship between sex and changes in attitude scores, self-concept scores and the Verification Frequency Simulation?
3. Is there a significant relationship between grade level and changes in attitude scores, self-concept scores and the Verification Frequency Simulation?
4. Is there a significant relationship between student grade average and changes in attitude scores, self-concept scores and the Verification Frequency Simulation?
5. Is there a significant relationship between teacher perception of students and changes in attitude scores, self-concept scores and the Verification Frequency Simulation?
6. Is there a significant relationship between ethnic origin and changes in attitude scores, self-concept scores and Verification Frequency Simulation?
7. Is there a significant relationship between socio-economic status and changes in attitude scores, self-concept scores and the Verification Frequency Simulation?
8. Is there a significant relationship between changes in attitude scores, self-concept scores and the Verification Frequency Simulation?

Assumptions

1. The NELD program as developed by the National Park Service is adequate in its ability to present environmental education materials to fifth and sixth grade students.
2. Attitudes of elementary students concerning their place in the environment can be changed and these attitudinal changes can be identified.
3. Attitudes can be measured by paper and pencil techniques.
4. Formation of acceptable attitudes is an important result of learning.
5. The Verification Frequency Simulation can be used to validate the results of attitude instruments and self-concepts instruments.
6. The devised Environmental Preference Test is a valid method for assessing attitudes.

Limitations

1. The study was limited to students in fourth, fifth, and sixth grades in public schools of the greater Knoxville, Tennessee areas and Atlanta, Georgia.
2. Measures of students' attitudes and self-concepts were based entirely on scores attained on the Missouri Children's Picture Series (MCPS), Environmental Preference Test (EPT), and the Verification Frequency Simulation (VFS).
3. Variables such as teacher attitude about the environment, the student's intelligence, or background knowledge concerning environmental education were not considered as part of the proposed investigation.

Definitions

A number of items used in this study may not have similar meaning to all readers. For the purpose of this study the definitions are:

1. Attitude. "A mental and neural state of readiness, organized through experience, exerting a directive influence upon the individuals' responses to all objects and situations with which it is related," (Allport, 1967).
2. Environment. "A matrix of elements derived by evolution through nature and contrived by man through culture," (Caldwell, 1971).
3. Environmental Education. "The production of a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution," (Stapp, 1969).
4. National Environmental Education Development (NEED) Program. An environmental education program developed by the United States National Park Service. The program is designed around man's interaction with his environment. The curricular materials are developed around five topics or strands: variety and similarity, patterns, interaction and interdependence, continuity and change, and adaptation and evolution. The curricular materials have been published by Silver Burdett, Morristown, New Jersey. For this study, the NEED program was designated as the activities undertaken at the Tremont Environmental Education Center, Tremont, Tennessee.

5. Self-Concept. The total meanings, attitudes and feelings which the individual has of himself and which can be defined as the standard score received from the sub-tests measured in the Missouri Children's Picture Series (Sines, 1966).
6. Socio-economic Status. A designation of the social class of the head of the household based on computed scores derived from two factors -- occupation and education (Hollingshead, 1957).
7. Verification Frequency Simulation. The frequency with which an individual subject reacts positively to a given environmental simulation.

Evaluation Procedures.

Participants in the NEED program activities arrived at the Tremont Environmental Education Center on Monday morning and departed on Friday afternoon. Shortly after their arrival, the participants were randomly divided into two sections. Section one was pretested (Monday morning) and both sections were posttested (Friday afternoon). Two control groups were selected from a number of week-long camping programs. The camping situations were chosen to resemble as closely as possible the Tremont NEED site. The camps were Camp Aquila, a YWCA Camp north of Rome, Georgia, and Camp Pioneer, a YMCA Camp south of Hiawassee, Georgia. The control groups were evaluated using methods identical to the experimental groups. Testing was accomplished by utlizing the Missouri Children's Picture Series (MCPS), the Environmental Preference Test (EPT) and the Verification Frequency Simulation (VFS).

Figure 1

Paradigm for Research Study

	Pretest	Group	Posttest
G_1	O_1	Tremont experience	O_2
G_2	O_3	Control	O_4
G_3		Tremont experience	O_5
G_4		Control	O_6

Fig. 1. Paradigm for Research Study, adapted from Donald T. Campbell and Julian C. Stanley, "Experimental Designs for Research on Teaching," Handbook of Research on Teaching, edited by N.L. Gage, Chicago: Rand McNally and Company, 1963.

Evaluation Instruments.

The Missouri Children's Picture Series (MCPS) is a non-verbal personality test developed by Jacob O. Sines and Jerome Pauher (1966). The instrument consists of 238 pictures printed on 3" x 5" cards. The child responds to the test by sorting the cards into two piles -- "Fun" and "Not Fun." Scores are then determined by computing "T" scores based on a standardized group. Scores are given on eight scales which are listed below in Reseach Design Key (p. 11). A ninth or total score can also be determined.

Sines (1972) reports 15 validity studies on the MCPS which indicate its usefulness in measuring personality change. Payne (1971) used the MCPS to identify attitude change in an intergroup camping situation which involved a very diverse sample of social situations. Vegely (1971) administered the MCPS to 160 deaf students with the findings indicating that the MCPS is satisfactory in measuring personality characteristics in deaf children.

The Environmental Preference Test (EPT) is a non-verbal attitude-rating instrument which was developed during the course of this study. The instrument consists of 100 slides (35mm) all of which relate to the physical environment.

If the child perceived a particular slide as being bad for the environment, he marked this number on an optical-scanning sheet. A score was then determined by evaluating the items selected as "Bad," with a value of 100 being the optimum score.

The slides were selected by a panel of experts (jury) and were categorized into the five environmental components identified in the National Park Service (NEED) Program (Appendix C). The components/strands are: variety and similarity, patterns, interaction and interdependence, continuity and change, and evolution and adaptation. Additionally, the jurors were asked to classify each slide into two divisions: (1) detrimental to the environment or (2) preservative of the environment. These two divisions provided the basis for determining test scores of students.

The Verification Frequency Simulation (VFS) was a contrived situation to indicate whether an attitude change creates in a person an actual behavioral change. An incident was planned that forced the student to make a choice revealing a changed behavior toward his environment.

Treatment

The treatment was the NEED program conducted at the Tremont Environmental Education Center.

Figure 2

Research Design

Source of Variation			Missouri Children's Picture Series 1 2 3 4 5 6 7 8	Environmental Preference Test 1 2
SEX	I	M		
		F		
	II	M		
		F		
AGE	I	A		
		B		
	II	A		
		B		
GRADE	I	4		
		5		
	II	4		
		5		
ACADEMIC	I	U		
		L		
	II	U		
		L		
TEACHER PERCEPTION	I	A		
		B		
	II	A		
		B		
ETHIC ORIGIN	I	W		
		B		
	II	W		
		B		
SOCIO-ECONOMIC STATUS	I	1		
		2		
	II	1		
		2		
VERIFICATION FREQUENCY SIMULATION	I	1		
		2		
	II	1		
		2		

(I) Indicates group one which was pretested and posttested.
(II) Indicates group two which was posttested only.

Statistical Treatment of Data

The statistical analysis was accomplished using point biserial correlation. The MCPS scores were converted to "T" scores which were used for correlation with the existing variables. The Environmental Preference Test values consisted of numerical values and were dealt with in a manner similar to the "T" scores. The Verification Frequency Simulation's value was a positive or negative score which was correlated to the other two test instruments. A sample of more than 200 subjects guaranteed power for the study.

Research Design Key

I. Instruments

A. Missouri Children's Picture Series (MCPS)

1. Conformity
2. Masculinity-Femininity
3. Maturity
4. Aggressivity
5. Inhibition
6. Hyperactivity
7. Sleep Disturbance
8. Psychosomatization
9. Total Score

B. Environmental Preference Test (EPT)

C. Verification Frequency Simulation (VFS)

1. Positive environmental reaction
2. Negative environmental reaction

II. Variables

A. Sex

M. Male

F. Female

B. Age

A. Under nine years six months

B. Over nine years six months

C. Grade

5. Fifth grade

6. Sixth grade

D. Academic (Academic standing of student as determined by teacher)

U. In the upper half of the class academically

L. In the lower half of the class academically

E. Teacher perception (Determined by parts 1-4 of Ryan's COR)

F. Ethnic origin

W. White or caucasian

B. Black or negroid

G. Socio-economic status

1. Below middle class

2. Above middle class

Chapter II

Review of Literature

A review of the literature pertinent to this study reflects the limited time that environmental attitudes and behavior have been of concern to the research community. With the exception of a few articles on conservation education and outdoor education, all studies were published in 1970 or later. As awareness of man's destruction of his environment increased, more and more researchers began to examine man's actual behavior, the attitudes such behavior suggests, and effective ways of modifying attitudes in order to bring about behavioral change. Three areas of the literature were examined.

Environmental Education Problems

The field of environmental protection is a rapidly advancing technological area. Libraries receive volumes each day that are concerned with research on environmental or ecological problems. Yet with all this research input, very little information has been assembled on the attitudes of the persons who are the root of the problem. The information available to researchers of environmental attitudes is organized into five categories.

1. Standardization

Lowenthal (1972) reported that the field of environmental attitudes, behavior, and perception remains as a whole essentially unorganized,

lacking a common set of definitions, objectives and mechanisms for applying research results to environmental planning and education. Research in this field needs to concentrate on an agreed method of classifying the variables already generated and all improved retrieval system.

He raised questions about the validity of attitude research, stating that little evidence exists to indicate that any of the artificial environmental descriptors such as simulation activities, environmental surrogates (models, pictures), and semantic analysis elicit the same responses or behavior which would occur in an actual environment.

Roth (1972) reports that the problems facing today's environmental educators are those of disparity in goals and objectives and concomitant lack of communication. In order to design environmental education programs based on attitude research findings, studies of environmental attitudes should be conducted with young children; however, Knapp (1972) reports very few studies conducted on this population.

2. Attitude Measures

Knapp (1972) reports a need for research which might link certain personal characteristics or experiences with environmental attitudes. In addition some research exists to indicate that attitudes are associated with certain specific characteristics such as age, sex, grades, school courses, and socio-economic status. A number of instruments for assessing attitudes have been developed during the past forty years. Recent investigations have been carried out by Fishbein (1967), Kerlinger (1964), Osgood, Suci and Tannenbaum (1957) and Edwards (1957).

Moore and Sutman (1970) reported that science attitude instruments should have one or more of the following characteristics:

1. Focus on a specific attitude to be tested.
2. Several items to assess each attitude.
3. Provision to accept or reject a statement.
4. Concern for intellectual and emotional attitudes.

One of the early attempts to measure conservation attitudes was done by Hoover (1963) using a Likert scale with 32 items. Science majors scored higher on the questionnaire of conservation attitudes than did nonscience majors. In support of the need for programs designed for elementary school students, Hess and Forney (1967) studied the political attitudes of 17,000 elementary students throughout the United States and discovered that the greatest attitude change took place during the fourth and fifth grades.

Bruvold's (1973) research had three foci:

1. Assessing environmental attitudes that exist in individuals and groups.
2. Describing differences between individuals and groups.
3. Identifying variables which would explain observed differences in attitude.

Using the interview method, a set of attitudes toward re-use of water was determined and the variables were compared to individual traits. This study attempting to examine a specific set of attitudes is typical of many of the research efforts currently being pursued by investigators (Sewell, 1972; Medalia, 1964; Constantine and Harf, 1972; Johnson, 1971; and Susko, et al, 1970).

Other attempts to assess attitudes toward environmental issues include: Erickson (1971), using a Q-sort consisting of 80 statements of opinion about wildlife, identified an array of attitudes; Stann and Bowes

(1972), using a Likert-scale questionnaire, assessed citizen attitudes concerning flood control projects; Rickson (1972), using a questionnaire, indicated that self-interest did not shape the responses of high school students toward pollution control.

Kreger (1973) questioned 28 black college students concerning their attitudes towards the environment. Although these black students were aware of environmental problems, they agreed unanimously that the black community was not as concerned with ecological problems as the white community. All the students were aware of the environmental problem but felt that other social problems were more important.

Steiner and Barnhart (1972) developed the Inventory of Societal Issues (ISI) which is a seven-scale Likert-type questionnaire for high school students.

Swan (1970) measured the attitudes of 35 male high school students toward air pollution, using a forced-choice attitude questionnaire, a knowledge test, and observational procedures. Swan concluded that environmental responses was multi-facted and therefore could not be identified using his instrument.

A national public opinion poll conducted by the Gallup Organization was designed to determine the relationship between population limitation and environmental quality. Barnett reported there appeared to be a relationship between these two attitudes but that the study was not definitive. Sikes (1972) studied the concerns of gifted students towards environmental problems. Towler and Swan (1972) studied fourth, fifth and sixth grade students and found that they showed little understanding of the factors affecting the environment and of their own personal involvement in these problems.

The problems of assessing attitudes is further complicated by the multidimensional foundations for attitudes. Two studies demonstrate this problem; the first by Bart (1972) indicated the presence of a hierarchy of environmental attitudes in graduate students. The findings for this group of subjects showed that there were two linear hierarchies formed, one which related to private or personal behavior or attitudes and another which referred to public behaviors or attitudes. The second study by Seed (1970) also showed the independence between public attitudes and private attitudes; private attitudes about littering were in disagreement with public attitudes about littering.

3. Attitude Change

The research of three investigators indicates that environmental attitudes change as a result of an educational program. Hamann (1972) developed an environmental attitude and values instrument for use with sixth-grade students to determine whether there is a change in student attitudes and values after instruction by a teacher who has been engaged in an in-service program. Hullman (1972) reported that teachers involved in outdoor education showed a change in attitude when compared to a control group which did not have outdoor education. In a related study, Lunneborg (1972) showed that a teacher's values and attitudes could be changed significantly by an environmental workshop.

4. Limited Language Skills

Limited language skills of younger children preclude the use of well-tested semantic instruments and necessitate therefore the use of nonverbal instruments. The use of nonverbal instruments for attitude evaluation is supported by Hunt and Brown (1971). In an analysis of

written material from three federal agencies dealing with environmental education they discovered that most of the material was written at a reading level far above its intended audience. Jakobovits (1969), commenting on the role of semantics in attitude assessment, indicated the problem that exists in any verbal or semantic transfer of attitude. He suggests that pre-school children, illiterate adults, physically handicapped persons, or slow readers might find a semantic assessment questionnaire difficult but would readily respond to pictures or symbols.

Mitchell and Lunneborg (1973) offered environmental education learning packages to first graders. The first graders were then evaluated for environmental awareness using parent and teacher evaluation and interviews. The problem identified in this study is the need for evaluative tools which can be given easily but do not require comprehensive reading skills.

Westwater (1972) found that a useful resource tool in environmental education was a wide screen multi-image presentation of slides. Additional studies using slides as a means of assessing attitudes have reported favorable results. Cantor (1972) used 35mm slides to study the effects of familiarization on children's perception of white and black people. Doran and Pella (1971) developed test items based on motion pictures of six elementary science concepts and reduced the need for verbal ability in the students. The use of pictorial media in these studies indicates that there is a way of assessing students' ability to use rather than to verbalize concepts.

Mortensen (1972) also experimented with a pictorial medium using 83 photographs to develop an Environmental Attitude Inventory which analyzed and described attitudes of tenth grade students toward selected aspects of the physical and man-made environment. A seven-item response

scale was used in connection with each picture. The instrument results were correlated to four variables which included residential community, socio-economic status, aptitude, and sex. Aptitude was found to be a major variable in influencing environmental attitudes; the study also showed changes in attitude scores for other variables. Of primary interest, however, is the knowledge that an instrument using pictures can assess attitudes with a degree of reliability.

The most relevant study, because of its similarity to this study, was done by Bennett (1972). Bennett used slides and pictures along with students written reactions to assess junior high school student attitudes towards specific environmental values and self-concept. A formal test instrument, Ecological Value System was developed to measure six sub-variables. A Solomon four-group design was used. The instrument was administered to a random selection of 25 students from the sixth through eighth grades who were involved in a two week program developed by the author. Significant differences between pre and posttest scores were found in the experimental group on two of the scales.

In an overall evaluation, the author reported that the test did not appear to show a significant difference between experimental and control groups. An unobtrusive test, a littering habit evaluation using strips of colored paper, was given but was inconclusive. The evaluation depended strictly on the evaluator's observations and was dropped because of technical problems. Bennett notes the failure of his unobtrusive instrument to be consistent in the evaluation of environmental attitudes but recognizes the difficulty of dealing with an inadequate measurement. Bennett concluded that slides are an effective means of evaluation and that more research is needed to develop an appropriate environmental

attitude instrument.

5. Littering

Littering is a major environmental problem in the United States. Yet of all the major areas of environmental deterioration, littering received the least emphasis. It cost United States tax payers $300 million annually to remove litter from the streets (United States Brewers Association, Inc., 1971). In 1970, 24,500 persons were arrested for littering (Keep America Beautiful, 1971) but the problem persists.

A Harris poll conducted for the Public Broadcasting Environmental Center (1970), indicated that certain groups are more likely to litter; in this case males litter more. In a related study Dodge (1972) determined that littering behavior could be altered by developing individual awareness and acceptance of responsibility for littering acts. Keep America Beautiful (1968) in their summary of survey findings concerning public awareness and concern about the littering problem found that everyone litters to some extent. The "Who Litters and Why" study determined that men litter more than women and that persons between 21 and 35 are the most extreme in their littering habits.

McCool and Merriam (1970) found that local residents of a resort area were less sensitive to litter problems than visitors and that compliance with anti-littering regulations is related to the subject's occupation. Finnie (1973) reports on a series of field experiments on litter control. The first two experiments were aimed at setting standards for designing and executing litter experiments. A third experiment, an observation conducted in Philadelphia, compared the age, sex, social status, and race variables with littering habits. Race had a significant effect on the rate of littering as did age, with persons

under 18 showing a much higher frequency of littering. No difference in littering was shown for males or females.

Clark, Hendee and Burgess studied littering habits of children under several conditions. In the first study (Clark, et al, 1971), an effort was made to determine the best method for regulating littering. This study determined that littering could be better regulated if rewards were given for not littering. The second experiment (Clark, et al, 1972) gave children in a national forest campground incentives for picking up litter. Littering was controlled more effectively by the incentives and also the amount of litter did not increase at the same rate after the experiment. Two later experiments on hiking trails and on car camping areas similar methods were used as incentives for picking up litter with similar results.

Self-Concept Studies

The Role of Self-Concept

The role of self-concept in determining environmental attitudes and behaviors is relatively unknown although the role of the self-concept in influencing behavior was well recognized by Rogers (1957) and received a central place in his personality theory. McCandless (1967) stated that a person's self-concept should be indicative of expected behaviors of that person. Persons with poor self-concept should reflect behaviors that show poor social or personal adjustment, and good self-concepts should be related to positive social and personal adjustment. Further studies supporting the effects of self-concept on behavior have been conducted by Steiner (1957), Wylie (1961), Coleman (1966), and Ausubel (1958).

Coopersmith (1967) reported the relationship of self-concept to anxiety. His findings indicated that persons with positive self-concepts are less anxious. The positive self-concept is also related to successful functioning in school and especially in certain school subjects (Bowdin, 1957; Lumpkin, 1963; Bozeman, 1958; and Trowbridge, 1972).

Self-concept and its effects on behavior are a complex organization of factors which have not yielded consistant research results. Bozeman (1958) reported that self-concept was not related to any particular variable such as sex, age, socio-economic status (SES) or education; rather it is a result of interaction of these factors plus others. Zirkil and Moses (1971) suggested that a diversity of results obtained in self-concept studies is related to differences in certain variables, unreliable instruments, and to the individuality that humans have which denies categorization. Wylie (1961) emphasized the complex nature of self-concept, relating that environmental changes may trigger varied self-concept reactions.

Trowbridge (1972) studied the relationship of self-concept to socio-economic status. Using Coopersmith's Self Esteem Inventory, she found that:

1. There was little statistical significance between sexes.
2. Self-concept stabilized at the sixth grade.
3. Socio-economic status (SES) had the greatest effect on self-concept.
4. Blacks had a higher self-concept than other races.
5. Density of population was a factor in self-concept.

These findings were supported by Peıkins (1958) who discovered that self-concept changed from fourth to sixth grade and then leveled off. The work of Piaget (1950) supports the hypothesis that fourth, fifth, and

sixth grade students are ideal subjects for changing attitudes and self-concepts. Piaget writes that self-concept is the result of cognitive development and that children in age groups involving fifth and sixth grade students are beginning to move from a purely concrete operation based on manipulation to a perception of self based on abstract or formal operations. This last or formal stage of concept development undergoes little change during the remainder of the person's life.

If there is a relationship between self-concept and environmental attitudes then it is necessary for an investigator of environmental attitude change to measure the variable of self-concept. The Missouri Children's Picture Series (MCPS) was selected for this purpose.

Missouri Children's Picture Series (MCPS)

The Missouri Children's Picture Series (MCPS) is an objectively-scored non-verbal personality test for children between the ages of five and sixteen. The stimuli consist of 238 line drawings of children engaged in various activities. The stimulus pictures originally were 3 inches by 5 inches white cards each numbered in the lower right corner. The pictures show children of indefinite ages and sometimes unclear sex and present varied situations in which one person (in darker print) is involved in an activity alone (e.g., riding a bicycle alone) or with a group (e.g., riding a bicycle with friends). The person may be a part of the group (e.g., playing tag) or watching from outside the group (e.g., at a play).

The child responds to the MCPS instrument by placing the picture cards in two piles; one is a "Not Fun" pile and the other becomes the "Fun to Do" pile. Scoring is accomplished with the use of a scoring sheet with 238 numbers on it. The numbers from each card in the "Not

Fun" pile is recorded on the answer sheet and a template with the proper values for each of the 8 scales is placed over the answer sheet. A raw score is obtained which is converted into a standard "T" score which can be plotted on a profile sheet. Normal performance on the MCPS is represented by a "T" of 50 with a standard deviation of 10. Scales 1, 2 and 3 are bipolar while scales 4-8 can be validly interpreted in one direction only.

In Scale 1 (Conformity), a high score represents high conformity, a low score low conformity. Scale 2 represents Masculinity-Femininity, with high scores masculine and lower feminine. Scale 3 (Maturity) uses a high score to indicate maturity, a low score immaturity. Scale 4 (Aggression) was represented by high scores as very aggressive and low scores as lacking aggression. In the remaining four scales 5 (Inhibition), 6 (Activity), 7 (Sleep Disturbance), and 8 (Psychosomatization), a high score indicated a high level of the self-concept which the scale was rating. A total or overall score may also be obtained by summing the raw scores for each of the scales and converting to a "T" score.

Payne and Platt (1971), using the Missouri Children's Picture Series (MCPS), studied the effects of a two-week camping experience on social behavior of 8 to 12 year old children from urban, suburban, and inner city neighborhoods. Changes in the MCPS were associated with sex, age, location of residence, and race and showed that camping experiences affect certain self-concept traits.

The Missouri Children's Picture Series (MCPS) has been used with consistent success to evaluate children with emotional problems (Towler, 1969), with behavioral problems (L'Abate and Newton, 1972), hearing problems (Vegely, 1971), and low school achievement (Timms, 1971). A

research review by Sines (1972) reports a number of studies where only one of the 8 scales was used in each case. The Missouri Children's Picture Series was also used to evaluate changes in self-concept in kindergarten children (Galina, 1972). The MCPS was found to have both validity and reliability (Sines, 1972).

Several features make the MCPS desirable for use with children (Vegely, 1971). The test is enjoyable from the child's point of view and is easy to administer and score. Testing time is short (about 20 minutes) and the test administrator need not maintain continual contact with the subject. Most important however, is the fact that the instrument minimizes verbal communication and reading skills; this feature is especially important for children with reading or hearing problems. In addition the 8 dimensions assessed in the instrument allow the researcher adequate evaluation tools to deal with the complex nature of the self-concept (L'Abate and Register, 1972).

Summary

There seems to be no studies to date relating self-concept to environmental attitudes or behaviors. In one study Williams and Paschal (1970) related self-concept to success in a summer Upward-Bound program. Labinowich (1971) called for a new investigation of environmental problems in which the self-concept, considered essential to environmental problem-solving, would be sustained. For the purpose of this study, the MCPS is used to relate self-concept to environmental attitude change. Modifications of the Missouri Children's Picture Series test and changes in administrative techniques are discussed in Chapter III.

The National Environmental Education Development (NEED) Program

The National Environmental Education Development (NEED) Program is produced with the cooperation of the National Park Service (Eviston, 1970) and is defined by them as a process for developing environmental awareness, understanding, and values through use of existing curricula of participating schools. It is designed for use in kindergarten through twelfth grade but is presently available only to fifth and sixth grade students and is to be used as an adjunct to normal school curricula (Bennett and Schwille, 1970).

Conceptually, the NEED program is based on five strands or environmental constants developed by the National Park Service Foundation (1971). These concepts can be used individually or in a related sequence which enhances their significance and utility.

1. Variety and Similarity -- the inventory stage of learning: cataloging the observable components.
2. Patterns -- organizing the inventory into sets of things we can handle, either actually or intellectually.
3. Interrelation and Interdependence -- the action stage of learning, where the environmental components are studied in action.
4. Continuity and Change -- the extension in time of continuing processes and changing action.
5. Adaption and Evolution -- the stage involving continuous modification which may result in adjustment to prevailing conditions.

The NEED program was originally designed as an outdoor experience (Menesini, 1968); thus, the students visit these NEED sites in order to have firsthand experience at seeing man and his place in the web of life; hopefully an "answer" surfaces in the child's mind: "I and the world are one, indivisible, the total web of life involves me and my every action" (Miller, 1969). Pre-site and post-site materials are available through the Silver, Burdett Company and are entitled Adventure in Environment.

Because the classroom NEED materials are designed to support and follow-up actual on-site NEED program outdoor experiences, the National Park Service has established 12 environmental education camps throughout the United States where children are actively involved in a week-long program (Miller, 1969). The Tremont Environmental Studies Area in the Great Smoky Mountains National Park, which started working with children in the fall of 1968, is the oldest NEED site in the park service. The Tremont Center functions in cooperation with Maryville College, Tennessee, which provides the staff and educational support (Shields and Foster, 1970).

The NEED program has reported no formal evaluation up to the time of this writing. Pilot testing was carried out on the printed materials to determine their acceptability to students with varied backgrounds (National Parks and Conservation Magazine, 1970); however, no report was submitted to show how attitudes were affected.

This study utilized subjects in the NEED program, as it is carried out in the Tremont Center, to measure environmental attitude change. The methodology is discussed in Chapter III.

Chapter III

Methods and Procedures

The study is divided into two parts: (1) evaluation of the National Environmental Education Development (NEED) Program now being conducted at the Tremont Environmental Education Center, Tremont, Tennessee; (2) development of an instrument which will assess attitudes and attitude changes of elementary students toward the physical environment. The resulting attitudes and attitudinal changes were then compared to the student's self-concept and to certain littering behaviors.

Assessment Instruments

I. Environmental Preference Test (EPT)

Picture Selection

The EPT instrument consisted of a set of 100 slides (35mm) selected from 5,000 made available by the United States National Park Service, Atlanta Chamber of Commerce, Georgia State University, F. Bennett Collins (a professional media specialist), and private photographers. The initial number of slides was reduced from 5,000 to 250 which were selected for these reasons: they evoked definite positive or negative feelings, as to whether the slide showed a situation which was either good or bad for the environment; each seemed to have an identifiable theme related to the physical environment; there were duplicates; and each represented one of the five environmental components or strands identified in the National Park Service (NEED) Program. These component strands include variety and

similarity, patterns, interaction and interdependence, continuity and change, and evolution and adaptation.

The 250 slides were then given to a panel of experts who served as a jury for evaluation. The 15 panel members included scientists, science educators, and park service employees; all jury members had experience in environmental education and were familiar with the five strands. The jury was asked to place each slide in one of the five strands and to note its environmental implication -- positive or negative. Each slide was then ranked according to its acceptance by the jury and 20 slides for each of the five strands were selected for inclusion in the instrument. The final group of slides was administered under testing conditions to members of the jury to determine the consistency of their choice. With less than 90 percent agreement the slide was replaced and the final 100 slides, the Environmental Preference Test (EPT), were administered to students in a pilot study. (Appendix F).

Pilot Testing of the EPT

Pilot testing was conducted in May, 1973 at two selected elementary schools in Atlanta -- E. Rivers Elementary School and Chattahoochee Elementary School -- on a sample population of 221 students from the fifth and sixth grade. The Atlanta Board of Education designated E. Rivers School to represent a predominant population in the upper half of the socio-economic status, and Chattahoochee School to represent a predominant lower socio-economic status population.

During testing the entire population of fifth and sixth grade students was brought into the cafeteria and seated before the movie screen. Carefully prepared written instructions (See Appendix B) were read to the subjects in an initial attempt to formulate standard test

administration procedures. Time for test completion ranged from 14 to 15 minutes with 20 to 25 minutes required for total administration. The posttest was administered on the Friday following the Monday pretest

Results of the pilot test were as follows:

1. No student difficulties were encountered in completing the biographical data.

2. No difficulties were identified concerning the length of the test or the slide-to-answer-sheet eye movement. The students regarded the activity as pleasurable and even personally satisfying.

3. Based on the three measures listed in Table 1 analysis of internal consistency for the Environmental Preference Test yielded high reliability coefficients in both the pretest and the posttest (Table 1) indicating a high degree of homogeneity and undimensionality in the instrument.

Table 1

Reliability Coefficients for Pilot Study Pretest and Posttest

Reliability Coefficient	Pretest	Posttest
Odd-Even	0.8083	0.7741
First Half -- Last Half	0.7728	0.5872
Kunder-Richardson Formula 20	0.8698	0.8413

4. Inductive statistical analysis consisting of a series of t-tests was run on four variables of the student population, school, grade, sex and race, to determine pretest influence (Table 2). The tests were two-tailed and significance was established at the .05 level of confidence.

Table 2

Pilot Study Pretest Influence

		N	X	S.D.	df	t
E. Rivers	I	122	76.762	8.69		
	II	122	78.713	8.83	242	1.735
Chattahoochee	I	64	67.125	9.83		
	II	64	68.609	9.82	126	.851
6th Grade	I	103	73.843	9.570		
	II	103	74.311	10.130	204	.340
5th Grade	I	83	72.639	10.848		
	II	83	77.084	9.240	164	2.851*
Male	I	107	74.538	10.221		
	II	107	76.670	9.628	212	1.574
Female	I	79	72.152	9.941		
	II	79	73.974	10.974	156	1.097
White	I	100	77.43	8.64		
	II	100	79.03	8.34	198	1.336
Black	I	86	68.814	9.8727		
	II	86	71.534	9.913	170	1.803
Total	I	186	73.446	10.165		
	II	186	75.548	9.81	370	2.037**

*Significant at 0.05 level
**Significant at 0.01 level

Results of this analysis indicated a significant increase between pretest and posttest scores for fifth grade students and for the total sample but the cause for the significance was not determined. Because a significance was not noted in other variables, the instrument was accepted as not having pretest influence.

II. Missouri Children's Picture Series (MCPS)

The Missouri Children's Picture Series was originally developed by Sines, et al. (1966) at the University of Missouri as a series of 238 cards. Because environmental attitude evaluation was being measured in this study using slides, it was determined that slides would be a proper vehicle for administration of the MCPS. With the use of slides, larger groups could easily be accommodated and the optical-scanning process would eliminate extra recorder and computer handling.

While watching the 238 slides which had been prepared by the audio-visual department of Georgia State University, each student marked his responses on two optical-scanning forms. The instructions were to mark "A" beside the appropriate number of the slide that showed a scene that was "not fun" and to mark "B" if the scene was fun. Viewing time was set at five second intervals with a short rest period after the first 100 slides were shown. (See Appendix B).

III. Verification Frequency Simulation (VFS)

The Verification Frequency Simulation (VFS) is an unobtrusive measure designed to sample littering habits of the student population. These littering habits were compared to certain self-concept or attitudinal traits of individuals or groups of children. The guiding principle observed in the use of this instrument was that the student being tested was unaware of the process.

In order for each student to have a litterable object in his hands each was given a candy bar and a cup of soft drink as a reward for indicating his responses to the slide tests. Both the candy bar and the cup were labeled sequentially with a grocery printing device and set together in numerical order so that as each student left the testing site, he traded his scored sheets for the snack. Thus the first test sheet was numbered one and its bearer received a candy bar and a cup of soft drink labeled number one, and as each set of papers was handed in, a similar sequential process was carried out. The students were asked to move to the lawn area to finish their snack and the teachers were warned not to mention littering and to allow a generally normal play condition. After the teachers had observed most students finishing their snacks, they assembled the group and moved to another area to continue with the normal NEED program of study.

When the students had gone, all litter not disposed of in an appropriate receptacle was gathered and the numbers noted on the reverse side of each test form. No attempt was made to add additional garbage receptacles or announce their location but at all times there was a disposal unit within ten meters. Later the group's path was followed by the researcher who collected additional litter that the group had carried away. Teachers were also asked to pick up and return any additional numbered papers not placed in a proper receptacle which was considered to be any object normally used in trash collection. Littering behavior was observed for one-half of the subjects during the pretest and for the entire posttest group.

Sample Population and Sample Locales

The sample consisted of 480 fourth, fifth and sixth grade students

from two metropolitan areas -- Atlanta, Georgia and Knoxville, Tennessee. (See Table 3). Subjects included both males and females who ranged in ages from 10 to 13 years.

The three schools represented in the experimental group are regular participants in the Tremont Environmental Studies Program. Many of the teachers had been at previous Tremont sessions either as leaders of classes or as participants in inservice programs. The students were well prepared to attend camp and had been participating in organized environmental education programs in their respective schools. The evaluative part of the week was represented to the students as a normal aspect of Tremont's program in order to minimize the effect that evaluation might have on the subjects' attitudes and littering behaviors.

The 155 sixth grade students attending the camp from Linden Elementary School, Oak Ridge, Tennessee, were evaluated during the week of May 14, 1973. The socio-economic status of the Linden community is identified as upper middle class, with many parents who are highly skilled or are professionals who work with the federal government or with closely allied industries.

The 83 fifth and sixth students attending the camp from Mableton Elementary School, Mabelton, Georgia were evaluated during the week of May 21, 1973. Mableton is on the northern edge of the metropolitan Atlanta area and although the town and its surroundings are undergoing a rapid transition to a suburban area, the major population remains a blue collar working area with a middle to lower middle class socio-economic status.

The 98 fourth, fifth and sixth grade students attending the camp from West Hills Elementary School, Knoxville, Tennessee, were evaluated

during the week of May 25, 1973. The students live in a residential area where many of the parents are skilled tradesmen or small business owners. The socio-economic status of the residents is middle class to upper middle class.

The YMCA and YWCA camps were selected as controls because of their traditional camping program which emphasizes recreation and focuses on the use of the environment rather than on an understanding of or interaction with the environment as is expressed in the NEED Camping Program.

Table 3

Sample Population and Sample Locales

Experimental Group	
Linden School, Oak Ridge, Tennessee	N = 155
Mableton Elementary, Mableton, Georgia	N = 83
West Hills Elementary, Knoxville, Tennessee	N = 98
Total	N = 336
Control Group	
Camp Pioneer, YMCA, Hiawassee, Georgia	N = 82
Camp Aquila, YWCA, Summerville, Georgia	N = 62
Total	N = 144

Camp Pioneer YMCA Camp is located near the small north Georgia mountain town of Hiawassee. Out of the total camp population, only the 82 fourth, fifth and sixth grade boys attending the two week camping program were evaluated on the week of July 1, 1973. The students attending the camp were from the YMCA program of Marietta, Georgia (a small city located north of Atlanta) which serves a Cobb County population

which includes Mableton, Georgia. Cobb County is a rural, middle to lower middle class county which is undergoing a rapid transition to a suburb as a result of the expansion of Atlanta. The children attending the camp covered all ranges of socio-economic status, although the majority were middle to upper middle class.

Camp Aquila YWCA is located at Summerville, Georgia, north of Atlanta. Out of the total camp population, only 62 fourth, fifth and sixth grade girls attending the two week camp were evaluated during the week of July 8, 1973. The YWCA camping program included girls from the entire Metropolitan Atlanta area and the majority of the students represented the middle to upper middle socio-economic status.

Procedures for the NEED Program Evaluation

Program evaluation was conducted by the author in the presence of participating teachers and Tremont Environmental Education staff. In all cases the students were pretested on the first day of camp and posttested during the morning of departure. Upon arrival at Tremont Environmental Education Center, the students were assigned sleeping areas and allowed to unpack. During this time the teachers were briefed on the investigation and times were allotted in the daily schedule for testing -- one and one-half hours for each evaluation session.

For purposes of assessing each child's socio-economic status, grade average, and teacher's judgment of the child's behavior (Teacher Preference), each teacher was given an evaluation form with six questions for each child. (See Appendix A). A copy of Hollingsworth (1957) (Appendix E) was available in case problems arose concerning determination of socio-economic status. Copies of Ryans' Classroom Observation Record (COR) glossary (Appendix D) were also included to aid in clarifying the

terminology used in assessing student behavior and teachers were instructed in the use of the Hollingsworth and Ryans aids. The information was then coded along with the other biographical data on the optical-scanning form.

The student population at the camp is normally divided into groups of 25 with a teacher and several parents assigned to each group. The groups in the study were randomly assigned either to be pretested or to join the regular program. As quickly as the program could be expedited the students to be pretested were congregated at the testing area for evaluation. Each student was given a pencil and three optical scanning sheets and instructions were given for taking the Environmental Preference Test (See Appendix B). After the EPT answer sheets were collected a short rest was allowed, followed by administration of the Missouri Children's Picture Series (MCPS). The pretest evaluation was completed when the Verification Frequency Simulation (VFS) was conducted and students returned to normal schedule.

The control group was evaluated in a similar way except that students were assigned by cabin rather than by teacher. Information on socio-economic status and grades was obtained by the author through interviews with the child or his parents, or by viewing camp records.

Posttesting was accomplished in a similar manner; at this time all students were evaluated with the exception of nine who failed to take the posttest. In the experimental group two boys refused to be retested, one boy returned home early, three girls were involved in other tasks which prevented them being retested; in the control group three boys were not retested because they were dissatisfied with "having to do the same thing over again." In all cases the information and test results of these

students were discarded and appear nowhere in this discussion.

Research Design

The research design chosen to assess the effectiveness of the Tremont Environmental Center's NEED Program was the Soloman Four-Group design as described by Campbell and Stanley (1963). The design is graphically represented in Chapter I and is diagrammed below.

Table 4

Research Design Representation

		P_1		P_2
Experimental Group	R	161	EC	161
			EC	175
				336
Control Group	R	65	C	65
			C	79
				144

P = Pretest and Posttest
C = Camping Experience
EC = Environmental Camping Experience at Tremont

Analysis

The data were analyzed in the following manner. A biserial correlation was used to test the relationship existing between the eight dependent and two independent variables. The biserial correlation was conducted using the Statistical Package for the Social Sciences (SPSS), a computerized program developed by the Department of Political Science and National Opinion Research Center at the University of Chicago (Nie, 1970).

Biserial correlation is a special case of Pearson Product-Moment Correlation. The biserial r is specifically designed for situations in which both variables are continuously measurable, but one of the two is for some reason reduced to two categories (Gilford, 1965). Eight variables were correlated with the Environmental Preference Test (EPT) and the Missouri Children's Picture Series (MCPS) to determine initially whether significant relationships existed. The eight variables were dichotomized and presented in Table 5 listing the number of subjects in each dichotomy.

After determing variables which correlated significantly with the EPT and/or MCPS scores, the data were examined to determine whether further statistical treatments of these variables were warranted. Where statistically significant differences existed among the pretest and post-test groups, z tests (using a Fisher's z-transformation) were calculated to determine the degree of significance.

Additional information was obtained by analysis of the relationships among the MCPS scales and the EPT scores. When the correlations from the BMD03D - Correlation with Item Deletion computer program (Dixon, 1968) showed a statistical significance, z tests (using a Fisher's z-transformation) were calculated on these values.

Additional information concerning relationships among treatment groups was computed for both mean score values and mean gain score values. The mean gain score values were treated using the SPSS - Version 5Ol One-Way Analysis of Variance computer program (Nie, 1970) and mean score values were analysed using a BMD01V - Analysis of Variance for One-Way Design computer program (Dixon, 1968).

Table 9

Dependent Variable Groupings

	Variable Dichotomy		
Age	Older than 11.5 as of 1 June 1973		242
	Younger than 11.5 as of 1 June 1973		238
Sex	Male		239
	Female		221
Grade Level	Fourth and fifth grade		266
	Sixth grade		214
Teacher Preference	Less than 3.99 on Ryans COR		170
	Equal to or greater than 4 on Ryans COR		310
Grade Average	Less than C		103
	Equal to or greater than C		377
Socio-Economic Status	Lower middle and lower class		103
	Middle-upper middle and upper class		377
Ethnic Origin	Black		19
	White		461
Verification Frequency Simulation	Listener	P_1	90
		P_2	133
	Non-listener	P_1'	133
		P_2'	347

Chapter IV

Analysis and Interpretation

This study was an investigation of specific student variables associated with attending the Tremont Environmental Study Area's National Environmental Education Development (NEED) program. Using a biserial correlation, student responses to the Environmental Preference Test (EPT), Missouri Children's Picture Series (MCPS), and Verification Frequency Simulation (VFS) were related to certain dependent variables and the Pearson Product-Moment Correlation was computed between the independent variables. Using a Fischer's z-transformation, the appropriate z values were computed to determine those differences between correlations which were significant.

Data from each of the independent variables was treated statistically by a one-way analysis of variance to determine variances within groups of the experimental and control populations. A one-way analysis of variance was also computed to determine the significance of mean gain scores between pretest and posttest experimental and control groups. Differences in means or in frequency distributions were considered to be significant at the .05 and .01 level as noted.

Six null hypotheses were generated and are listed in this chapter with the data relating to each hypothesis presented and analyzed. The results of this study are organized into a series of tables and figures and are discussed throughout the chapter with tables of statistical results

displayed in separate appendices. Correlational treatment was used to determine if it were possible to associate certain descriptive variables with environmental attitudes (EPT), self-concepts (MCPS), and littering habits (VFS). Analysis of variance treatment was used to determine if there were evidences of contamination in results of posttest because of the use of a pretest. Analysis of variance was also used to establish comparability of the experimental and control groups.

Analysis of Data

Hypothesis I

No significant difference will be observed between experimental and control groups at the beginning of the week long camping experience as determined by data derived from responses on the EPT, VFS, and MCPS Scales.

These data were analyzed to ascertain (Table 8) the variations occurring in group mean scores between the pretest experimental and control groups. If significant F value for this treatment indicated that differences appeared within each group before experimentation began and thus could bias the results.

Ten sources of variation were investigated in this statistical treatment; the Verification Frequency Simulation, Inhibition and Psychosomatization showed significance. In the VFS scale, a mean value of 2.00 indicates a non-litterer and a mean value of 1.00 denotes heavy littering. The mean value of 1.66 for the experimental group and 1.38 for the control group showed significant variation at the .01 level, suggesting that the initial populations for this study did not have the same littering habits. The hypothesis of no significant differences was rejected for the Verification Frequency Differential.

Table 6

Means and Standard Deviations
for Treatment Totals

Scale	P_2 Totals		C_2 Totals	
	Mean	SD	Mean	SD
VFS	1.78	0.42	1.60	0.49
EPT	84.39	7.35	76.28	11.56
CON	45.01	12.30	43.44	11.61
MF	53.60	10.76	50.94	9.70
MAT	52.71	9.77	49.90	10.31
AGG	51.10	9.60	50.57	10.04
INH	49.25	12.20	45.88	10.58
HYP	53.67	8.80	56.26	9.21
SLD	54.63	11.83	52.94	10.03
PSY	46.98	8.31	49.09	9.13

As shown in Table 8, a significant difference was obtained for both Inhibition and Psychosomatization Scales. An experimental group mean of 49.06 and control group mean of 42.95 on the Inhibition Scale showed significant variation between the two scales. The MCPS Scale description (Sines, et al, 1966) predicts that more inhibited behavior occurs among children who achieve higher scores. The students attending the experimental NEED program achieved higher scores and were predicted to have more inhibited behavior than the students in the YMCA-YWCA program. The hypothesis of no significant differences was rejected for the Inhibition Scale.

An experimental group mean of 47.73 and control group mean of 43.66 on the Psychosomatization Scale was significantly different at the .01 level. The higher Psychosomatization score is well within the normal range (Sines et al, 1966) but indicates a higher level of somatization (concern about physical well-being) in the experimental group. The hypothesis of no significant differences was rejected for the Psychosomatization Scale.

As shown in Table 8, no significant differences were obtained between scores for seven variables. The hypothesis of no significant differences was not rejected for the Environmental Preference Test, Conformity Scale, Masculinity Femininity Scale, Maturity Scale, Aggressive Scale, Hyperactivity Scale and Sleep Disturbance Scale.

Hypothesis II

No significant difference will be observed between means of the pretest/posttest group and the posttest only group as determined by data derived from responses on the EPT, VFS, and MCPS Scales.

These data were analyzed to ascertain (Table 8) the variations

Table 7

Means and Standard Deviations of Pre and Posttest Treatment Groups

Variables	Experimental Group				Control Group			
	Pretest		Posttest		Pretest		Posttest	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
VFS	1.66	0.49	1.78	0.41	1.38	0.52	1.43	0.50
			1.77	0.41			1.73	0.44
EPT	81.16	7.61	84.34	84.34	79.55	15.45	78.75	10.93
			6.90	7.75			74.25	11.74
CON	44.86	11.85	44.98	12.74	41.55	14.19	42.38	13.18
			45.03	11.91			44.32	10.15
MF	51.52	10.73	53.48	11.44	51.34	13.52	53.11	10.93
			53.71	10.12			49.16	8.20
MAT	52.49	11.08	52.54	10.49	50.26	13.30	49.97	11.76
			52.89	9.13			49.85	9.02
AGG	50.99	10.76	51.19	9.87	49.80	11.95	41.51	10.94
			51.02	9.37			49.80	9.23
INH	49.06	11.44	49.67	13.18	42.95	11.81	46.46	11.76
			48.99	11.20			45.39	9.56
HYP	52.60	10.09	54.39	8.46	49.98	13.89	54.78	10.34
			53.04	9.11			57.46	8.04
SLD	54.06	12.15	54.50	12.09	51.75	14.10	53.49	11.05
			54.74	11.63			52.48	9.20
PSY	47.73	8.90	47.77	8.74	43.66	12.74	48.14	9.58
			46.35	7.93			49.87	8.72
	N = 161		N = 161		N = 65		N = 65	
			N = 175				N = 79	

occurring in group mean scores between posttest experimental groups. Ten sources of variation were investigated in this statistical treatment with the analysis of variance for the two posttest treatment groups showing no significant variations at the .05 level. The hypothesis of no significant differences was not rejected for all variables of the Missouri Children's Picture Series and the Verification Frequency Simulation.

Hypothesis III

No significant difference will be observed between the posttest only mean scores and the pre/posttest mean scores for the control group as determined by data derived from responses on the EPT, VFS, and MCPS Scales.

These data were analyzed to ascertain (Table 8) the variations occurring in group mean scores between control group posttests. Ten sources of variation were investigated in this statistical treatment (see Table 7) with the means of the control group posttests being compared to determine whether significant variation existed at the .05 level. Variation existed in the VFS, EPT, and MF variables.

The reported mean in the VFS Scale of 1.43 for the control group pretest/posttest was significantly different from the mean for the posttest only control group. The hypothesis of no significant differences was rejected for the Verification Frequency Simulation.

The EPT mean score of 78.75 for the pretest/posttest control group varied significantly at the .05 level from the mean score for the posttest only control group. The hypothesis of no significant differences was rejected for the Environmental Preference Test.

The MF mean score of 53.11 for the pretest/posttest control group varied significantly at the .05 level from the mean score of the posttest only control group. A higher MF scale value on the MCPS denotes more

Table 8

Variance Ratios for Treatment Groups

Source of Variation	Treatment Groups 1	2	3	4
DF	1-224	1-334	1-142	1-478
VFS	14.71**	0.06	14.87**	16.72**
EPT	1.03	0.01	5.58*	84.99**
CON	3.21	0.00	0.99	1.69
MF	0.01	0.04	6.11*	6.53*
MAT	1.68	0.10	0.00	8.04**
AGG	0.53	0.03	1.04	0.30
INH	12.95**	0.26	0.36	8.33**
HYP	2.48	1.96	3.07	8.47**
SLD	1.51	0.03	0.36	2.25
PSY	7.46*	2.44	1.29	6.13*

* Significant at .05 level
** Significant at .01 level

[1]A description of the column headings is given in Table 9

Table 9

Population of Treatment Groups

Treatment Groups	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
1	161		65	
2		161 175		
3				65 79
4		336		144

masculine characteristics (Sines et al, 1966) and the scores of the control group predicted that these characteristics were present. The hypothesis of no significant differences was rejected for the Masculinity-Femininity (MF) Scale.

As shown in Table 8, no significant differences were obtained between seven of the ten variables. A hypothesis of no significant differences was not rejected for each of the following scales: Conformity Scale, Maturity Scale, Aggressivity Scale, Inhibition Scale, Hyperactivity Scale, Sleep Disturbance Scale, Psychosomotization Scale.

Hypothesis IV

No significant difference will be observed between the combined experimental groups (pre/posttest experimental group and posttest only experimental group) posttest mean scores and the combined (pre/posttest control group and posttest only control group) posttest mean score as determined by data derived from responses on the EPT, VFS, and MCPS Scales.

These data were analyzed to ascertain (Table 8) the variations occurring in group mean scores between total experimental and control group posttest. Ten sources of variation were investigated in this statistical treatment (see Table 8) with the means of the total control and experimental group posttests being compared to determine whether significant variation existed. Variation was found to exist for seven of the variables (see Table 8).

Verification Frequency Simulation. The reported mean for the VFS total experimental group posttest was 1.78 as compared to the total control group posttest mean of 1.60; and showed variation which was significant at the .01 level. The means revealed that the control group students littered in greater quantities than did the students attending the Tremont Environmental Study Program. The hypothesis of no significant

differences was rejected for the Verification Frequency Simulation Scale.

Environmental Preference Test. As shown in Table 8, a very significant F ratio was obtained by comparing the means of the total experimental group posttest and the total control group posttest. The students attending the Tremont Environmental Education program showed a significant variation in environmental attitudes as expressed on the EPT as compared to the control group. The hypothesis of no significant differences was rejected for the Environmental Preference Test.

Masculinity-Femininity Scale. Table 8 reveals that a significant variation at the .05 level existed between the mean of the total experimental group posttest and total control group posttest. Differences in the two means indicated that the experimental Tremont group ended the week-long camping session exhibiting more masculine tendencies as indicated by the MCPS than the control group. The hypothesis of no significant differences was rejected for the Masculinity-Femininity Scale.

Maturity Scale. Table 8 reveals a significant difference at the .01 level between the means of the total experimental group posttest and the total control group posttest. A high Maturity score on the MCPS indicates a greater degree of maturity among the individuals tested (Sines et al, 1966). The group of students attending the Tremont Environmental Study Program finished the program with a greater degree of maturity than students in the control group, as exhibited by MCPS scores. The hypothesis of no significant differences was rejected for the Maturity Scale.

Inhibition Scale. Table 8 reveals a significant difference at the .01 level between means of the total experimental group posttest and the

total control group posttest. The higher Inhibition score indicates greater inhibition in student behavior. The students attending Tremont Environmental Study Program presented significantly more inhibited behavior, as represented by scores on the MCPS, than did the control group students. The hypothesis of no significant differences was rejected for the Inhibition Scale.

Hyperactivity Scale. A significant difference at the .01 level was found to exist between the means of the total experimental group posttest and the total control group posttest. The higher scores on the Hyperactivity Scale indicate behavior having a high activity level (Sines et al, 1966). The students participating in the Tremont Environmental Study Program displayed less hyperactive behavior, as expressed by the MCPS, than students attending the control session. The hypothesis of no significant difference was rejected for the Hyperactivity Scale.

Psychosomatization Scale. A significant variance at the .05 level was found to exist between means of the total experimental group posttest and the total control group posttest. The higher mean score on the Psychosomatization Scale of the MCPS for the control group indicated a greater degree of concern about physical well-being. Students attending the Tremont Environmental Study Program showed significantly less psychosomatic behavior, as expressed on the MCPS. The hypothesis of no significant differences was rejected for the Psychosomatization Scale.

As shown in Table 8, no significant differences were observed on three variables for this statistical treatment. The hypothesis of no significant differences was not rejected for the Conformity Scale, Aggressivity Scale and Sleep Disturbance Scale.

Hypothesis V

No significant difference will be observed between the experimental group pretest scores and the experimental group posttest scores as determined by data derived from responses on the EPT, VFS, and MCPS Scales.

These data were analyzed using students' t to ascertain the variations occurring in group mean scores between the experimental pretest group and the experimental posttest group. Ten sources of variation were investigated in this statistical treatment (see Table 10) with the means being compared to determine whether significance existed at the .05 level. Variation (Table 10) existed for the EPT Masculinity-Femininity, Hyperactivity, and Verification Frequency Simulation variables.

The reported mean for the Verification Frequency Simulation (VFS) of experimental group pretest was 1.42 as compared to the experimental group posttest mean of 1.71; and showed variation which was significant at the .01 level (see Table 10). The means revealed that the group littered more at the pretest time than they did at posttest time suggesting that the NEED program experience did positively change littering habits. The hypothesis of no significant differences was rejected for the Verification Frequency Simulation.

Environmental Preference Test. As shown in Table 10, the EPT mean score for the experimental pretest group varied significantly at the .01 level from the mean score for the experimental posttest group. The students attending the Tremont Environmental Education (NEED) Program showed a significant positive change in environmental attitudes as indicated by a pretest/posttest comparison. The hypothesis of no significant differences was rejected for the Environmental Preference Test.

Table 10

Analysis of Experimental Protocol
and Pretest Scores
for the Tested Variables

	df	N	Mean	SD	t Value
VPS	160	161	1.42 1.71	.52 .45	3.90**
EPT	160	161	81.11 84.43	7.61 6.90	6.76**
CON	160	161	43.22 43.16	11.34 12.67	0.05
MP	160	161	51.82 53.47	9.89 11.41	1.70*
VAL	160	161	32.81 32.30	10.19 10.47	0.49
ASC	160	161	31.34 31.10	9.98 9.82	0.31
INS	160	161	49.29 49.67	10.82 13.17	0.38
STP	160	161	32.94 34.43	9.19 8.46	2.24*
SLD	160	161	34.37 34.38	11.37 11.95	0.01
PSY	160	161	47.73 47.80	8.87 8.72	0.12

* Significant at the .05 level
** Significant at the .01 level

Masculinity-Femininity Scale. Table 10 reveals that a significant variation at the .01 level existed between the means of the pretest experimental group and posttest experimental group. A variation in masculinity scores indicated that the group ended the week with a significantly higher masculine score on the MCPS. The hypothesis of no significant differences was rejected for the Masculinity-Femininity Scale.

Hyperactivity Scale. A significant difference at the .05 level was found to exist between the means of the experimental group pretest and the experimental group posttest. The higher scores on the Hyperactivity Scale indicate a possible increase in behavior with a higher activity level. The hypothesis of no significant differences was rejected for Hyperactivity Scale.

As shown in Table 10, no significant differences were found in six of the ten variables. A hypothesis of no significant difference was not rejected for each of the following MCPS scales: Conformity, Maturity, Aggressivity, Inhibition, Sleep Disturbance, and Psychosomatization.

Hypothesis VI

No significant difference will be observed in the mean gain scores between the experimental pre/posttest group and the control pre/posttest group as determined by data derived from responses on the SPT, VPS, and MCPS Scales.

Table 11 shows the results of analysis of data which ascertained variations occurring between gain scores means for the pretest/posttest experimental and control groups. Ten sources of variation were investigated in this statistical treatment with the gain score means being compared to determine whether significant variation existed. Variation was found to exist in two of the ten variables.

Table 11

Variance Ratios for Gain Scores
Between Pretest and Posttest of Control and Experimental Groups

	df	N	Mean	SD	F Ratio
VPS	1-224	161	0.110	.665	0.52
		65	0.046	.717	
SPT	1-224	161	3.32	4.255	6.87**
		65	- .80	17.407	
CON	1-224	161	0.112	10.270	0.10
		65	0.830	14.178	
MP	1-224	161	1.956	8.721	0.02
		65	1.769	10.792	
MAT	1-224	161	0.370	9.097	0.06
		65	-0.292	9.775	
ASS	1-224	161	0.192	11.228	0.74
		65	0.708	13.720	
INT	1-224	161	0.409	9.242	3.75
		65	3.308	12.239	
MEP	1-224	161	1.783	9.254	3.74
		65	4.800	13.336	
SLD	1-224	161	0.453	11.972	0.53
		65	1.738	12.190	
PSY	1-224	161	0.6373	7.186	10.63**
		65	4.477	13.086	

* Significance at .05 level
** Significance at .01 level

Environmental Preference Test. The reported EPT gain score mean of 3.32 for the experimental group varied significantly at the .01 level from the control grup mean gain score of -.80. The greater mean gain score on the EPT of the experimental group indicates a greater positive gain in environmental attitudes for the children attending the Tremont Environmental Education Program. The decrease in mean score differences indicated the children attending the control camping program had a decrease in environmental attitudes as expressed by the EPT. The hypothesis of no significant differences was rejected for the Environmental Preference Test.

Psychoneumatication Scale. The reported Psychoneumatication Scale gain score mean of .017 for the experimental group varied significantly at the .01 level from the control group mean gain score of 4.477. The greater mean gain score on the MCPS Psychoneumatication Scale of the control group indicates a greater increase in psychoneumatic activity among the children attending the YMCA and YWCA camps. The hypothesis of no significant differences was rejected for the Psychoneumatication Scale.

As shown in Table II, no significant differences were found in seven of the ten variables. A hypothesis of no significant differences was not rejected for each of the following scales: Verification Frequency Simulation, Conformity Scale, Masculinity-Femininity Scale, Maturity Scale, Aggressivity Scale, Inhibition Scale, Hyperactivity Scale, and Sleep Disturbance Scale.

Summary of Data

To summarize the results obtained by the analysis of the treatment groups, the following trends and conclusions seem to be warranted by the findings of this study: (The F ratios obtained for the analysis of vari-

ance were significant at the .05 level or better).

Scores of the experimental group which were administered pretest and posttest were compared to scores for those who took only the posttest. There was no significant difference between means of the variables in these two groups. The fact that there were no significant differences between the means of these two groups indicates that the pretest did not sufficiently affect the posttest and thus raise its score.

The control group which was both pretested and posttested was compared to the posttest only group with analysis indicating the significant difference occurred between three sets of variables. (1) The students who were pretested showed only slight change in littering habits. The mean littering value changed from 1.38 to 1.43 for this group while the group not pretested produced a mean of 1.73, a significant difference for the posttest score at the .01 level. This difference indicates that the two control posttest groups were not equal in littering habits. (2) A similar disparity existed in the control group posttest reaction to the EPT and the MF Scale. On the EPT the group which was pretested showed a decrease in mean scores (Table 7) while the posttest only group produced a significantly lower score. (3) The MF Scale results showed a slight increase in mean masculinity scores for those students who were both pretested and posttested. The group which was posttested only produced a significantly lower score. The information obtained indicates that the posttest only control group entered the camping program with a range of littering habits, environmental attitudes and Masculinity-Femininity self-concepts.

The WFS littering variable (discussed in (1) above) which was significant, could possibly have been contaminated when the researcher observed

one student (a girl who was pretested) moving through the testing area picking up discarded candy wrappers and paper cups of other students. The experimenter made an attempt to reconstruct the littering pattern without further biasing the results. Although test administration and student participation was not as orderly in the control group evaluation, the differences could not explain the significant variation in the EPT or the MF Scale while the other values remained unchanged.

The analyses of variance between the two pretest groups indicated significant differences existed in three of the variables. Analysis of the VPS variable indicated that the control group littered more than the experimental group. Two other variables, Inhibition and Psychosomatization, also showed significant variation between means of the two groups. This significant variation indicates that the two pretest groups were not comparable in at least three of the ten variables used to assess them. The importance of the analysis of variance in this study was its demonstration that the use of a pretest did not contaminate the results for either the experimental or control group. If variation existed in both groups and if most variables were higher for the posttest, one would be forced to conclude that the taking of the pretest must be affecting the results of the posttest. The pretest did not affect the posttest results in the experimental group as indicated in the lack of significance on most variables. A lack of consistent differences between all of the variable means for the control population indicated that the pretest did not affect posttest outcomes but that the two control groups had certain self-concept and attitude characteristics which varied.

The posttest total group analysis (Table 8) indicated that there were significant differences between means of the experimental and control

groups for seven of the ten variables, however, this significance did not always persist gain scores for the two posttest groups were analyzed (Table 11). Analysis of variance of gain scores revealed that only two variables were significantly different at the .05 level. The Environmental Preference Test posttest mean gain score for the experimental group was 3.32 while the posttest mean gain score for the control group decreased with a variance ratio of 6.87 (Table 11) which was significant at the .01 level.

Results of the Psychosomatization Scale (Table 11) for the posttest groups also showed significant variation at the .01 level between experimental and control group mean gain scores. Analysis of the posttest scores for the same groups on the EPT and Psychosomatization Scale revealed a significant F value indicating a measurable difference in the resulting attitudes by direct comparison of posttests and analysis of gain made between the pretest and posttest.

Two additional self concept variables, Inhibition and Hyperactivity, showed differences in mean gain scores between the experimental and control group but were not significant at the .05 level (Table 11). The two variable scores were also significantly different when the posttest data were analyzed with the Tremont population revealing more inhibited and less hyperactive behavior as expressed on the MCPS Scales. The remaining self-concept variables, two of which varied significantly when the control and experimental posttest scores were analyzed (Maturity and Masculinity-Femininity) but did not exhibit significantly different mean gain scores. In almost every instance the control group's mean scores were more radically changed than those of the experimental group (Table 11).

Analysis of difference between pretest and posttest experimental group means indicated that four variables (Table 10) showed significant variation. One variable, the EPT, showed significance in both the pretest/posttest comparison and the gain score comparison. The VFS, MF, and Hyperactivity Scales (Table 10) showed significant mean gains between the experimental pretest and posttest; however, the increases were not great enough to be significant when compared to the control group gain scores (Table 11).

Summarization of Analysis of Data

In summary, inductive statistical analysis indicates that (1) the NEED program presently being conducted at the Tremont Environmental Education Center may significantly change environmental attitudes, littering habits and certain self-concept variables; (2) the EPT does measure some environmental attitudes and attitude changes of fifth and sixth grade students; (3) the Tremont Environmental Education Program appears to be more successful in changing environmental attitudes than the control YMCA and YWCA camps, as determined by the instruments used in this study and (4) littering habits can be measured using the VFS and can be changed by the Tremont Environmental Education (NEED) Program.

Analysis of Correlations Between Variables

Biserial correlation coefficients were computed for all variables in this study with Tables 12 and 14 containing a complete listing of all correlations between variables. Tables of correlation coefficients were constructed for all variables with significant correlation and serve as a guide for the statistical analysis used in this study. For convenience, the correlation coefficients were divided into two matrices: (1) corre-

lation between test and descriptive variables, and (2) correlation between tested variables. These matrices are presented in tables as each variable is discussed.

When a significant correlation was noted between two variables under the various statistical treatments, a test was computed to determine whether differences were significant between these two correlations. A Fischer's z-transformation of r was made for each correlation using the method described by Glass and Stanley (1970). The z-transformation scores were tested statistically using the following formula:

$$Z = \frac{Zr_1 - Zr_2}{\sqrt{\frac{1}{n_1 + 3} + \frac{1}{n_2 + 3}}}$$

The resulting z values are reported in tables accompanying each variable discussed and significant correlation and z values are identified in the discussion of statistical results.

Correlation Between Tested and Descriptive Variables

Correlational treatment was used to determine the association which may exist between biographic or descriptive variables and environmental attitudes as determined by the EPT, self-concepts as determined by the MCPS scale and littering habits as determined by the VFS. This section will be organized by descriptive variables with correlation in Table 12 and intercorrelation values in Table 13. Significance will be given at the .05 level or greater.

Correlation with Age

The EPT, MCPS Scales, and VFS were correlated with the age variable which was dichotomized for statistical purposes into two subject groups,

those older than 11.5 and those younger than 11.5. Nine tested variable scores showed significant correlation with the age descriptive variable for both the pretest and the posttest, and revealed no statistical difference when z-values were obtained for significance of correlational variation. The following tested variables were significantly correlated: EPT, Conformity Scale, Maturity Scale, Aggressivity Scale, Inhibition Scale, Psychosomatization, and the VFS. The MF scale showed no significant correlation on either the pretest or posttest scores.

Correlation with Sex

The EPT, MCPS Scales and the VFS were correlated with the sex (MF) variable which dichotomized for statistical purposes into two subject groups, those that were male and those that were female. Three tested variables were correlated significantly (.03 level) with the sex descriptive variable for both the pretest and the posttest and revealed no statistical significance when z-values were obtained for intercorrelational variation. The following tested variables were significantly correlated: MF Scale, Maturity Scale, Hyperactivity Scale, Psychosomatization Scale. The Inhibition Scale revealed no correlations for either the pretest or the posttest scores while the EPT score variable showed correlation on the posttest scores while the EPT score variable showed correlation on the posttest with no intercorrelation significance between the two test scores. The Conformity Scale, Aggressivity Scale and VFS variables were significantly correlated on the posttest while the z-value for intercorrelational variation was significant at the .05 level indicating a change in correlation between the pretest and the posttest.

Correlation with Grade Level (GL)

The EPT, MCPS Scales and VFS were correlated with the grade level (GL) variable which was dichotomized for statistical purposes into two subject groups, those in the fourth and fifth grades and those in the sixth grade. Eight tested variable scores showed significant correlation with the grade level variable for both the pretest and posttest and revealed no statistical significance when z-values were obtained for intercorrelational variation. These variables were the EPT, Conformity Scale, Maturity Scale, Aggressivity Scale, Inhibition Scale, Sleep Disturbance Scale, Psychosomatization Scale, and the VFS. The MF Scale score was correlated with grade level on the pretest but not on the posttest while the z-value was not significant at the .05 level. The Hyperactivity Scale was not significantly correlated on the pretest but correlation was significant on the posttest; no significant z-value was found between these two correlations.

Correlation with Teacher Preference (TP)

The EPT, MCPS Scales and VFS were correlated with the teacher preference (TP) variable which was dichotomized for statistical purposes into two subject groups; those who received a rating of 3.99 or less on the student behavior section of Ryan's Classroom Observation Record (COR) and those scoring greater than 4.00 on the COR. Students receiving a higher score are preferred by the teacher. Five tested variables (MF Scale, Aggressivity Scale, Hyperactivity Scale, Psychosomatization Scale, and VFS) showed no significant correlations with the teacher preference variable for either the pretest or the posttest. Both the EPT and Conformity Scale scores were significantly correlated with the TP variable for the pretest and the posttest but displayed no significant z-value scores. The Maturity

Scale, Inhibition Scale and Sleep Disturbance Scale scores were correlated significantly on the pretest but not the posttest; none of the three showed significant z-values.

Correlation with Grade Average (GA)

The EPT, MCPS Scales and VFS were correlated with the grade average (GA) variable which was dichotomized for statistical purposes into two subject groups, those with less than a C average in school and those with a C average or better in school. The EPT, Conformity Scale and Sleep Disturbance Scale scores showed significant correlations with the GA variable for both the pretest and posttest with no significant z-values computed. The MF Scale, Hyperactivity Scale and VFS scores were not significantly correlated for either the pretest or the posttest. The Maturity Scale, Aggressivity Scale and Psychosomatization Scale scores were significantly correlated on the posttest but differences between the pretest correlations were not great enough to reveal significant z-values. The Inhibition Scale scores were significantly correlated on the pretest.

Correlation with Socio-Economic Status (SES)

The EPT, MCPS Scales, and VFS were correlated with the socio-economic status (SES) variable which was dichotomized for statistical purposes into two subject groups, those in the lower middle and lower class and those in the middle, upper middle and upper class. No significant correlation between seven tested variables and the SES descriptive variable was found to exist; these variables are EPT, Conformity Scale, Maturity Scale, Aggressivity Scale, Inhibition Scale, Sleep Disturbance Scale and VFS. Two variables, the MF Scale and Hyperactivity Scale showed significant correlations in the pretest scores with the z-values indicating a significant difference between pretest and posttest correlations for the MF Scale but

not significant for the Hyperactivity Scale. The Psychosomatization Scale scores were significantly correlated for the posttest but the p-values indicated no significant difference between correlations.

Correlation with Ethnic Origin (EO)

The EPT, MCPS Scales and the VPS were correlated with the ethnic origin (EO) variable which was dichotomized for statistical purposes into two subject groups, those that are black and those that are white. Significant correlations were found to exist between the Ethnic Origin (EO) descriptive variable and EPT and VPS variable scores for both the pretest and the posttest. Both variables were found to have significant p-values indicating that the relationship of the two variables had changed. Three variables (Conformity Scale, Masculinity-Femininity Scale, Inhibition Scale) showed significant pretest correlations and five variables (Maturity Scale, Aggressivity Scale, Hyperactivity Scale, Sleep Disturbance Scale, Psychosomatization Scale) revealed significant posttest correlations. When compared using p-values, all correlations for the eight variables were found to very significantly between pretest and posttest.

Correlation Between Tested Variables

Using a Pearson Product-moment Correlation, the EPT, MCPS, and VPS were statistically analyzed in order to show where relationships exist between the three variables. The correlation values are reported in tables for each statistical treatment with significance levels at .05 or higher. The focus of this study is such that the relationship of the EPT and VPS scores to each other and to the MCPS Scales scores is more important than the relationship of the MCPS Scales to each other, thus the MCPS Scale correlations will be included in Tables 10 and 11 but will

Table 12

Correlations Between Tested and Descriptive Variables

Tested Variable	Treatment	MN	SD	Descriptive Variables							
				Age	Sex	GL	TP	GA	SES	ED	VFS
EPT	P_1	81.11	7.61	-.23**	.13	.39**	.23**	.17*	.08	.33**	.01
	P_2	84.39	7.35	-.21**	.15**	.29**	.23**	.20*	.07	.73**	.10
CON	P_1	44.86	11.85	-.29**	.15	.37**	.25**	.20*	.01	.27**	.08
	P_2	45.01	12.29	-.28**	.18**	.32**	.22**	.14*	.04	-.10	.00
MF	P_1	51.53	10.73	-.00	.59**	.17*	.01	-.12	-.27**	-.31**	-.03
	P_2	53.60	10.76	.04	.60**	.06	.08	-.01	.04	-.03	.13*
MAT	P_1	52.49	11.01	.51**	.33**	-.49**	-.19*	-.12	-.07	.02	.09
	P_2	52.72	9.79	.53**	.30**	-.45**	-.02	-.13*	-.01	.26**	-.02
AGG	P_1	50.99	10.76	-.22**	-.12	.18**	-.10	.02	-.02	-.03	-.16*
	P_2	51.10	9.60	-.38**	-.20**	.39**	-.03	.14*	-.02	-.39**	-.04
INH	P_1	49.06	11.44	.23**	-.01	-.29**	-.19*	.17*	.05	.44**	.07
	P_2	49.32	12.17	.22**	-.07	-.27**	-.12*	-.01	-.00	.09	-.03
HYP	P_1	52.60	10.09	-.23**	-.23**	.08	.07	-.07	-.16*	-.01	-.01
	P_2	53.68	8.82	-.27**	-.27**	.19**	-.04	.08	-.08	-.26**	-.06
SLD	P_1	54.06	12.15	.51**	-.01	-.53**	-.24**	-.25**	-.01	-.14	-.10
	P_2	54.63	11.83	.43**	-.03	-.46**	-.11	-.27**	-.02	.36**	-.09
PST	P_1	47.73	8.90	-.26**	-.33**	.16*	.12	.13	-.03	-.13	.09
	P_2	47.03	8.35	-.30**	-.40**	.22**	-.04	.18**	-.17**	-.20**	-.04
VFS	P_1	1.66	.49	-.32**	-.01	.25**	-.07	.03	-.16*	-.24**	
	P_2	1.78	.42	-.18**	.19**	.16**	-.08	.02	-.08	.17**	

P_1 n = 161
P_2 n = 336

* Significant at .05 level
** Significant at .01 level

Table 13

Tests for Significance of Intercorrelations Between
Tested and Descriptive Variables

Tested Variable	Descriptive Variables							
	Age	Sex	GL	TP	GA	SES	SO	VFS
SPT	0.269	0.239	0.406	0.234	0.172	0.103	6.067**	1.139
COM	0.165	0.269	0.590	0.320	0.590	0.311	3.872*	0.828
MF	0.414	.238	1.170	0.725	1.139	3.282*	3.075*	1.646
MAT	.280	.393	.528	1.843	.041	0.621	2.650*	1.139
ACC	1.822	.901	2.371*	0.725	1.273	0.000	3.924*	1.232
INS	.114	0.621	.228	.797	1.905	0.518	3.641*	1.035
NTP	.445	.497	1.294	1.139	1.552	.838	2.557*	0.518
SLD	1.128	0.207	.963	1.346	1.377	0.104	5.393*	0.104
PST	.507	.776	.663	1.656	.600	1.408	3.448*	1.346
VFS	1.605	2.029*	1.067	0.104	0.104	0.828	4.317*	

* Significant at .05 level
** Significant at .01 level

not be discussed in depth in this presentation.

Correlation with the Environment Preference Test

The EPT was significantly correlated to the Sleep Disturbance Scale scores on both the pretest and posttest with no significant p-values indicated. The VFS, Aggressivity Scale, Hyperactivity Scale, and Psychosomatization Scale scores revealed no correlation on either the pretest or posttest and no significant p-value for intercorrelation variation. The Conformity Scale score was significantly correlated to the EPT on the pretest while the MF Scale, Maturity Scale and Inhibition Scale were significantly correlated on the posttest scores with no correlations reflecting a significant p-value for intercorrelation variation. The EPT showed no significant correlation.

Correlation with the VFS

The VFS scores were significantly correlated with two of the nine tested variable scores. These significant correlations were with the MF Scale scores on the posttest and with the Aggressivity Scale scores on the pretest. In both cases the p-values were not significant.

Summarization of Correlation Between Variables

To summarize the results obtained by the correlation between variables of the studies, the following seemed to be warranted by the findings of this study with these correlations indicating that relationships exist among certain variables and environmental attitudes, self-concept or littering habits. The relationships may be very strong, as indicated by a very high correlation value, or very slight, as indicated by a lower value, but where stronger correlations do exist between variables in the pretest group the significance is consistent into the posttest group.

Table 14

Pretest Experimental Correlation Matrix for the Environmental Preference and the Missouri Children's Picture Series Scale

Tested Variable	Treatment	EPT	CON	MF	MAT	AGG	INH	HYP	SLD	PSY
EPT										
CON	P_1	0.26**								
	P_2	0.26**								
MF	P_1	0.07	0.23**							
	P_2	0.13*	0.36**							
MAT	P_1	-0.14	-0.30**	0.06						
	P_2	0.01	-0.30**	0.12*						
AGG	P_1	0.05	0.06	-0.16*	-0.50**					
	P_2	-0.02	0.16**	-0.13*	-0.58**					
INH	P_1	-0.05	-0.26**	-0.43**	-0.40**	-0.30**				
	P_2	-0.13*	-0.51**	-0.39**	-0.41**	-0.24**				
HYP	P_1	0.01	-0.01	-0.37**	-0.48**	0.30**	0.09			
	P_2	-0.00	0.04	-0.29**	-0.49**	0.39**	0.01			
SLD	P_1	-0.22**	-0.40**	-0.05	0.52**	-0.32**	0.23**	-0.23**		
	P_2	-0.13*	-0.51**	-0.10	0.56**	0.41**	0.37**	-0.29**		
PSY	P_1	0.05	0.02	-0.32**	-0.51**	0.16*	0.09	0.54**	-0.30**	
	P_2	-0.05	0.10	-0.25**	-0.53**	0.35**	0.03	0.52**	-0.36	
VFS	P_1	0.01	0.08	-0.03	0.09	-0.16*	0.07	-0.01	-0.10	0.09
	P_2	0.10	0.00	0.13*	-0.02	-0.04	-0.03	-0.06	-0.09	-0.04

P_1 n = 161
P_2 n = 336

* Significant at .05 level
** Significant at .01 level

Table 15

Tests of Significance of Intercorrelations
Between Tested Variables

Tested Variable	EPT	CON	MF	MAT	AGG	INH	HYP	SLD	PSY
CON	0.114								
MF	0.590	1.263							
MAT	1.552	0.000	0.621						
AGG	0.724	0.943	0.290	1.170					
INH	0.808	3.002*	0.435	0.124	.735				
HYP	0.103	.517	0.870	0.207	1.056				
SLD	1.046	1.594	0.797	0.445	1.398	1.377	0.225		
PSY	1.04	1.035	0.828	0.280	2.050*	0.621	0.362	0.693	
VFS	1.138	0.931	1.646	1.138	1.232	1.035	0.518	0.103	1.345

* Significant at .05 level

Correlation Between Tested and Descriptive Variables

Significant correlations were found to exist between the EPT scores and all independent variables except the SES and littering habits, the variables which were most highly correlated were Grade Level and Ethnic Origin. A significant change in correlation between the pretest group and posttest group was noted for the Ethnic Origin variable.

Significant correlations at the .05 level were found to exist between the Conformity Scale and all descriptive variables except SES and littering habits (VFS). The variable with the greatest correlation to the Conformity Scale is the Grade Level variable. A significant change in correlation between the pretest group and posttest group was noted for the Ethnic Origin variable.

Significant correlations at the .05 level were found to exist between the M-F scale and the following descriptive variables: Sex, Grade Level, SES, Ethnic Origin, and littering habits (VFS). The greatest relationship exhibited for this variable correlation was that between the MF Scale and sex. No correlational variable remained significant in both the pretest and posttest and a significant change in correlation between the pretest group and the posttest group was noted for the SES and EO variables. A fairly large correlation change (not significant) was noted for the VFS indicating a possible predictive value for the MF Scale.

Significant correlations at the .05 level were found to exist between the Maturity Scale and all descriptive variables except SES and littering habits (VFS). The variables with the greatest correlation to the Maturity Scale were age, sex and grade with TP, GA and EO significant on either the pretest or posttest. A significant change in correlation between the pretest and posttest was noted for the Ethnic Origin variable.

Significant correlations at the .05 level were found to exist between the Aggressivity Scale and all descriptive variables except Teacher Preference and SES. The variables with the greatest correlation to the Aggressivity Scale were age and grade with sex, grade average, ethnic origin, and littering habits significant on either the pretest or the posttest. A significant change in correlations between the pretest and posttest was noted for the grade level and the ethnic origin variables. A significant correlation on the pretest between littering habits (VFS) and the Aggressivity Scale indicates the possible predictive value of the variable.

Significant correlations at the .05 level were found to exist between the Inhibition Scale and all descriptive variables except sex, SES and littering habits (VFS). The variables with the greatest correlation are age, grade, and teacher preference with grade average and ethnic origin variables showing significance on either the pretest or the posttest. A significant change in correlations between the pretest and posttest was noted for the ethnic origin variable.

Significant correlations at the .05 level were found to exist between the Hyperactivity Scale and the age, sex, grade level, SES and EO descriptive variables. The variables with the greatest correlation are age, sex and grade with the SES and EO variables showing significance on either the pretest or the posttest. A significant change in correlations between the pretest and posttest was noted for the ethnic origin variable.

Significant correlations at the .05 level were found to exist between the Sleep Disturbance Scale and age, grade level, teacher preference, grade average and ethnic origin descriptive variables. The variables with the greatest correlation are age, grade level, and grade average with the

teacher preference and ethnic origin variables showing significance on either the pretest or the posttest. A significant change in correlation between the pretest and the posttest was noted for the ethnic origin variable.

Significant correlation at the .05 level were found to exist between the Psychosomatization Scale and age, sex, grade level, grade average, SES and ethnic origin descriptive variables. The variables with the greatest correlations are age, sex and grade level with the grade average, SES and ethnic origin variables showing significance on either the pretest or posttest. A significant change in correlation between the pretest and the posttest was noted for the ethnic origin variable.

Significant correlations at the .05 level were found to exist between the VFS and age, sex, grade level and ethnic origin descriptive variables. The variables with the greatest correlations are age and grade level with the sex variable showing significant correlation on the posttest and the ethnic origin variable showing a wide variation in correlation. A significant change in correlation between the pretest and posttest groups was noted for the sex and ethnic origin variables. Littering habits appears to be related in the experimental group to both sex and ethnic origin variables.

Correlations Between Variables of the EPT, VFS, and MCPS

Significant correlations at the .05 level were found to exist between the EPT and the Conformity, M-F, Inhibition and Sleep Disturbance Scales of the MCPS. The variables with the highest correlations are Conformity and Sleep Disturbance with the M-F and Inhibition variables showing significance only on the posttest. No significant change in correlations between the pretest and posttest was noted. Significant correlations

at the .05 level were found to exist between the VFS and the M-F and Aggressivity Scales of the MCPS but were not consistent for both testing sessions.

Chapter V

Summary, Conclusion, Limitations, and Recommendation

The focus of this study was an assessment of the effectiveness of the Tremont Environmental Education Center's NEED Program; and the study consisted of three parts or purposes. One part focused on the development of a nonverbal instrument to assess environmental attitudes (EPT); a second part assessed the Tremont Program's ability to modify environmental attitudes; and the third part determined relationships which might exist between student descriptive variables and environmental attitudes, self-concepts, and littering habits.

Summary and Conclusions: Development of the EPT

To establish internal reliability for the Environmental Preference Test (EPT), the pilot study was carried out and a Kuder-Richardson 20 reliability coefficient of ($r = .81$) and a split-half reliability coefficient of ($r = .87$) were obtained for the pretest. After one week the posttest was given with a Kuder-Richardson 20 coefficient of ($r = .77$) and a split-half reliability of ($r = .84$) resulting from the test analysis.

Using a t-Test, the pretest and posttest data was analyzed for test-retest reliability. No significant difference was found in all data analyzed except one fifth grade group in one school. Because of the high internal reliability and consistant test-reteet reliability of the instrument, the Environment Preference Test (EPT) was considered reliable.

Summary and Conclusions: Assessment

In order to evaluate the Tremont Environmental Education Center's NEED Program, the following questions were studied: Was the Tremont Environmental Education Center's NEED Program effective in changing environmental attitudes, self-concepts, and listening habits? The Tremont Environmental Education Center's NEED Program proved effective in changing environmental attitudes, listening habits and two self-concept variables. The most significant change was found in environmental attitudes as expressed by the EPT where a mean gain score was significant at the .01 level. The listening habits of the camping group was established by the Verification Frequency Simulation (VFS) and was found to decrease as a result of the Tremont experience. The Missouri Children's Picture Survey (MCPS) scale scores for the Masculinity-Femininity and Hyperactivity scales showed significant change with a decrease in mean scores for both variables. Did the use of a pretest affect the scores on the posttest? The analysis of mean between experimental posttest groups showed no significant differences on the EPT, MCPS scales or the VFS. The lack of differences indicated that the pretest did not influence the posttest for the experimental group. The mean between the two control posttest groups showed a significant variation between the scores of the posttest group. The variation appeared in the group which was not pretested thus supporting the premise that taking the pretest does not significantly affect the posttest results. Did the experimental Tremont group achieve significantly greater scores than the control camping groups on the EPT, MCPS Scales and VFS? Analysis of mean scores and mean gain scores between the experimental of control groups indicated that certain variables showed a definite difference, with the

experimental group showing greater positive change on the evaluation. The littering habit analysis indicated a significant difference between the total mean posttest scores; however, this difference was not significant for pretest-posttest gain scores. It should be noted that the control group littered more heavily during the pretest session and that certain discrepancies (Chapter VI, p. 57) occurred during the control group posttest session which may have contaminated the results.

Definite differences existed in the results of analysis of EPT means for the control and experimental posttest total groups. These differences were also analyzed for pretest-posttest gain score means and the differences remained significant. The MCPS scale scores which varied significantly from pretest to posttest were the MF, Mat, Inh, Hyp, and Psy Scales but only one case (the Psy scale) were the differences substantial when gain scores were analyzed. Other findings indicated that the control group expressed more psychosomatic tendencies and in two other MCPS Scales (Inhibition and Hyperactivity) showed a marked gain which indicated movement towards less inhibited and more hyperactive behavior. In the study, where ever a change in self-concept occurred between the pretest and posttest, the YMCA-YWCA control group varied by a greater amount in all scales except the MF Scale. It appears that the Tremont experience significantly affected environmental attitudes and littering habits, and maintained or slightly improved self-concept.

Summary and Conclusion: Relationship Among Variables

Correlation with Littering Habits

The data analysis indicates that older children (sixth grade do not litter as much as younger (fourth and fifth grade) children while the sex correlations indicate that males litter more. Although the Ethnic Origin

analysis showed correlations with littering, the small number of black students in the study prohibit using the values for any predictive purpose. No consistent self-concept prediction variables appeared as a result of this study although the M-F, Hyp, Agg and Psy scales each produce one treatment correlation with the littering habit variable.

Correlation with Environmental Attitudes (EPT)

Self-concept values that correlated significantly with the EPT scores were the Conformity and the Sleep Disturbance Scales. In this study high conformity scores correlate with high EPT scores and a high environmental attitude score correlated with a lower Sleep Disturbance score. Two other scales, Inhibition and Masculinity-Feminity, correlated significantly on the experimental posttest but not on the pretest.

Correlation of the descriptive variables with the EPT showed several significant relationships, with the students that the teachers prefered scoring higher on the EPT. A positive correlation was also noted between the older age group (sixth grade) and higher scores on the EPT. Ethnic Origin was correlated with EPT with black students having lower scores on the EPT, however, the small number of black students in the study makes prediction from this result impossible.

Limitations

Because all of the subjects were southerners from either the Knoxville or Atlanta area, the population was a limiting factor for this study.

Leadership for the control group was supplied by paraprofessionals while the experimental groups were led by trained, professional teachers. In addition, the control group itself was significantly different in some respects from the experimental group; therefore, the results of this study cannot be extrapolated to other populations without further research

to establish the effectiveness of the Tremont NEED Program as the significant factor in attitude change. A limitation in the use of the MCPS is the necessity to use self report data rather than observation of behavior.

Educational Implications

Many educational planners are aware of the need for improved programs in environmental education. If environmental attitude improvement is important then the results of this study indicate that the Tremont Environmental Education Center's NEED Program may provide a model that could be included in future educational planning. The implications of the study is that a week long camping program under the direction of professional educators may well be considered for inclusion in an elementary education curriculum. This study strongly suggest that the sixth grade is the optimum place in the elementary school for effective utilization of the NEED Program. Whether more benefits would accrue for students beyond elementary school age should be determined by further research. Certain implications can be drawn from the environmental attitude data as it relates to littering habits. Because no relationships were identified between these two variables this study would suggest that programs emphasizing environmental information might not change littering habits. Littering appears to be a habitual act which has not been taught cognitively, therefore, changing this behavior must be accomplished using habit breaking procedures. This study implies rather strongly that environmental attitudes of fifth and sixth grade children have no relationship to actual individual behavior. A possibility also exists that social interactions are more important in controlling littering than personal attitudes. If the social pressure implication is true, then

education of groups in reference to littering habits is more important than education of the individual.

Recommendations for Further Research

In addition to future studies to determine if higher grade levels should be involved in this program, there is need for further research in several areas: (1) in obtaining precise demographic and descriptive data for larger popultions; (2) in improving technique for assessing changes in environmental attitudes and in self-concept as it relates to these attitudes; and (3) in refining and extending experimental research based on the EPT, VFS, and the NEED Program concept.

Descriptive Studies

Research is required for both the EPT and the VFS that gives more descriptive data about larger, more varied popultions. An additional study should be undertaken with a complete range of grade levels and ages from kindergarten through college with emphasis on the relationships of certain descriptive variables to environmental attitudes.

The Ethnic Origin variable, which consistently correlated with the EPT and VFS, was considered an unreliable predictor by the researcher because of the low numbers of black subjects. Since black students consistently scored lower than whites on the environmental attitude tests, a study needs to be undertaken to determine if specific and significant participation of minority groups in environmental education programs would result in increased environmental awareness.

Studies need to be conducted which explore the attitudes of students from a wider variety of socio-economic levels than were present in the study. An implication of the study is that Socio-Economic Status (SES) is a factor in both littering and environmental attitudes, but, as was

true for the Ethnic Origin variable, inadequate numbers of subjects were present to determine possible relationships.

Results of this study indicated a strong correlation between the Conformity Scales and a high score on the EPT. If this implication is validated by further research on various populations it should be possible to predict those students who will score high on the EPT simply by measuring conformity. An additional factor which correlates with both the EPT and Conformity Scale is teacher preference. A study should be conducted to determine the extent of interchangeability of these three instruments.

A descriptive variable which calls for future research is the identification of persons within populations who are litter "picker-uppers"; that is, children who value anti-littering enough to pick up the litter their friends have dropped. If techniques are identified that can be shown to change littering habits, then populations should be better identified where these techniques can be profitably used.

Measurement Techniques

In order to more accurate measure changes in environmental attitudes, a valid, reliable, standardized measurement instrument must be developed. Future studies should be conducted to determine these statistics for the EPT. Some indicated studies include:

1. Correlation of the EPT to semantic instruments,
2. Item analysis of the EPT based on present population and larger samples,
3. Collection of data using a wider range of demographic variables and a much larger population,
4. Development of alternate or specific forms of the EPT.

Several additional studies on the VFS are warranted to refine data on littering habits. To control external contingencies, the techniques for administering the VFS need modification that will provide for improved distribution and labeling techniques, expanded strategies for longer observation, and increased use of professional supervisors and observers. In order to extrapolate to older and younger people and other socio-economic status groups, studies based on much larger populations must be carried out.

Experimental Research

If littering can be decreased, further questions to be explored are: (1) how much littering is too much? (2) Can littering be eliminated completely within a population?

A research question of singular importance which this investigation did not approach is the longevity of the attitudes created or changed by the experience at the Tremont NEED Program. Longitudinal studies should be carried out to determine the duration of the effects of (1) repeated exposures to the Tremont NEED experience, (2) increasing the program's duration to two weeks or longer, (3) decreasing the program to three days, (4) carrying out a similar program in a concentrated one week effort in the regular school setting, (5) developing a day-use only program, (6) comparing this NEED Program's effect on attitude change to other existing or newly designed programs, and (7) identifying those specific teacher characteristics and behaviors which may positively affect environmental attitude change.

Appendix A

Student Bibliographical Evaluation Sheet

Appendix A

To Be Filled Out By Teacher

Use the optical scanning sheet to answer the following questions about the student. Place the answer on the answer sheet to the right of the child's name. If you have questions, I will be available Thursday evening.

1. The approximate grade average in all subjects (1) C (2).

   Write (1) or (2) if the student is left or right of "C".

This child's behavior can be judged as the following.

2.	Apathetic	1	2	3	4	5	6	7	Alert
3.	Obstructive	1	2	3	4	5	6	7	Responsible
4.	Uncertain	1	2	3	4	5	6	7	Confident
5.	Dependent	1	2	3	4	5	6	7	Initiating

When making the above judgments, consider (1) to be most like the left adjective and (7) to be most like the far right adjective. Number (4) in the center is a neutral position. Write in the number on the answer sheet which corresponds to the appropriate number on the continuum.

6. Socio-economic status of the student

   1. Upper class
   2. Upper middle class
   3. Middle class
   4. Lower middle class
   5. Lower class

Appendix B

Administration Instructions for the Environmental Preference Test and the Missouri Children's Picture Series

Hi. I'm _____ and I have some slides about the environment; I would like to have you tell me how you feel about them. You will give your answer on a special paper so that I will be able to use the computer to tell me how you answered. First, you need to fill out the special answer sheet so that I will know whose paper I have. There is a slide on the screen which shows what will be answered. Ask me or one of the teachers for help if you need it. First fill in the spaces to show:

1. Your school, city and grade.
2. The instructor is your teacher.
3. Write in and block out your name.
4. Write in and block out your grade, birth date and sex.
5. Don't worry about anything else.
6. Has everyone filled in all of the information shown on the slide? Then we are ready to find out how you fell about the slides of the environment.

There are 100 slides. Each slide will be shown for eight seconds; that isn't very long so look carefully and quickly. As a slide comes on the screen you are to ask yourself if the slide shows something that is "bad" for the environment. If the slide does show something that is bad for the environment, mark "A" beside that number. I will call out the numbers for each slide. If the picture shows something "good" or if you don't know whether it's "bad" for the environment, leave the entire space blank. Do nothing for that number and wait for the next slide. The slides will not be repeated so watch carefully. There will be a short rest period after fifty slides. (Turn out remaining lights and begin slides. After the last slide is finished shut off the projector and turn on the lights).

I have another slide instrument that I want your help with and its

done the same way as the environmental slides. First, there are two special answer sheets which you will need to complete by blackening in only the name space. Forget about all other spaces. Has everyone filled in all of the information shown on the slide. Then we are ready to find out how you feel about the slides.

There are 238 slides. Each slide will be shown for eight seconds; that isn't very long so look carefully and quickly. As a slide comes on the screen you are to ask yourself if the slide shows something that is "not fun" to do. If the slide does show something that is "not fun" to do, mark in "A" beside that number. The number for each picture is on the lower right corner of the slide. If the picture shows something "fun" or if you don't know whether it's "not fun" to do, leave the entire space blank. Do nothing for that number and wait for the next slide. The slides will not be repeated so watch carefully. There will be a short rest period after fifty slides. (Turn out remaining lights and begin slides. After the last slide is finished shut off the projector and turn on the lights).

Now that you have finished telling me how you fell about the slides, I would like to have you fill in the "B" block in all those places where the "A" has not been blackened. Remember if the "A" is marked you leave the number alone; just fill in "B" where you have not answered "A".

Now, if you are finished marking in the "B" blocks, line up the door. I have a snack for you. Leave your pencils in the box beside me as you pass out. Thanks for your help

Appendix C

A List of Jury Members

Jury Member	Location	Position
Dr. Louis Gardner	Georgia State University	Science Educator
Dr. John Hassard	"	"
Dr. Edward Lucy	"	"
Dr. Ted Colton	"	"
Dr. Sidney Smith	"	"
Dr. Ashley Morgan	"	"
Dr. Mildred Graham	"	"
Dr. Hansel Cross	"	Biologist
Dr. Blanche Greggs	"	"
Shirley Davis	M.C.E.S.A.	Science Educator
John Hamilton	Georgia Technical Institute	Biologist
Robert Hayward	Fernbank Science Center	Science Educator
Dr. Donald Lucas	Fernbank Science Center	Meteorologist
Brook Pridmore	Clayton Junior College	Physics Teacher
Dr. Pamela Rhyne	Kennesaw Junior College	Science Educator
Harold Bassett	Georgia Technical Institute	Physics Teacher
Charles Chetwynd	Dekalb County, Georgia	Elementary School Teacher
Jan Baker	Kennesaw Battlefield National Historical State	National Park Service Environmental Specialist
Paul Engstrom	Kennesaw Battlefield National Historical State	Environmental Specialist

Appendix D

Glossary of Pupil Behaviors

To Be Used With The

Classroom Observation Record

Appendix D

Glossary of Pupil Behaviors To Be Used With
Classroom Observation Record

I. Apathetic-Alert Pupil Behavior

Apathetic	Alert
1. Listless	1. Appear anxious to recite and participate
2. Bored-acting	2. Watch teacher attentively
3. Enter into activities half-heartedly	3. Work concentratedly
4. Restless	4. Seem to respond eagerly
5. Attention wanders	5. Prompt and ready to take part in activities when they begin
6. Slow in getting under way	

II. Obstructive-Responsible Pupil Behavior

Obstructive	Responsible
1. Rude to one another and/or to teacher	1. Courteous, cooperative, friendly with each other and with teacher
2. Interrupting, demanding attention disturbing	2. Complete assignments without complaining or unhappiness
3. Obstinate; sullen	3. Controlled voices
4. Refusal to participate	4. Received help and criticism attentively
5. Quarrelsome; irratable	5. Asked for help when needed
6. Engaged in name-calling and/or tattling	6. Orderly without specific directions from teacher
7. Unprepared	7. Prepared

III. Uncertain-Confident Pupil Behavior

Uncertain	Confident
1. Seem afraid to try; unsure	1. Seem anxious to try new problems or activities
2. Hesitant; restrained	2. Undisturbed by mistakes
3. Appear embarrassed	3. Volunteer to recite
4. Frequent display of nervious habits, nail-biting, etc.	4. Enter freely into activities
5. Appear shy and timid	5. Appear relaxed
6. Hesitant and/or stammering speech	6. Speak with assurance

IV. Dependent-Initiating Pupil Behavior

Dependent	Initiating
1. Rely on teacher for explicit directions	1. Volunteer ideas and suggestions
2. Show little ability to work things out for selves	2. Showed resourcefulness
3. Unable to proceed when initiative called for	3. Take lead willingly
4. Appear reluctant to take lead or to accept responsibility	4. Assume responsibilities without evasion

Appendix E

Two Factor Index of Social Position

Appendix E

Two Factor Index of Social Position

A. Occupational Scale

1. Group I
   a. higher executives
   b. large proprietors
   C. major professionals

2. Group II
   a. business managers
   b. proprietors medium sized business
   c. lesser professionals

3. Group III
   a. administrative personnel
   b. small independent businessmen
   c. small business owners
   d. semi-professionals
   e. farmers

4. Group IV
   a. clerical and sales workers
   b. technicians
   c. owners of small businesses

5. Group V
   a. skilled manual employees
   b. small farmers

6. Group VI
    a. machine operators
    b. semi-skilled employees
    c. tenant farmers

7. Group VII
    a. unemployed (no occupation)
    b. share croppers - migrant workers

B. Educational Scale
1. graduate professional training
2. standard college graduation
3. partial college training
4. high school graduates
5. partial high school
6. junior high school
7. less than seven years of school

To calculate the Index of Social Position score for a parent the value given for an occupational group is multiplied by a factor weight of 7, and the scale value for education is multiplied by the factor weight of 3 with the two products summed. Social class is then predicted by the following breakdown of scores.

Social Class	Range of Computed Scores
I	11 - 17
II	18 - 27
III	28 - 43
IV	44 - 60
V	61 - 77

(A. B. Hollinghead, 1957)

Appendix F

Environmental Preference Test (EPT)

Slide Description

Appendix F

Environmental Preference Test (EPT)
Slide Description

1. Ground squirrel in a hole
2. Strip mine in West Virginia
3. Industrial photo with much smoke and air pollution
4. Aerial view of strip mining area
5. Assassin Bug eating leaf hopper
6. Glacier Bay, Alaska, from water inward to land
7. A multitude of Artic Terns in flight
8. An aerial view of the Badlands National Park, North Dakota
9. A paint pot in Yellowstone National Park, Wyoming
10. Pink flower in grass
11. Aerial view of Colorado River in Grand Canyon
12. Black Widow spider
13. View of eroding soil in a drainage ditch below a housing development
14. Close up view of cactus (Opuntia sp.) in bloom
15. Photo of Atlanta's Regency Hyatt House from upper floor
16. A view of the beach on the California Coast
17. Jungle-like growth in Panama
18. Stream showing trash can and paper
19. A Preying Mantis eating a cockroach
20. View of a ghetto street: paper, old car and rubbish are visible
21. A prairie scene from Custer Battle Field, Montana
22. The corner of the Atlanta Fine Arts Museum
23. Close up of grassblades
24. Florida beach
25. Death Valley National Park, view of small alkali lake

26. Snake climbing on a rock wall
27. City street with boarded building and a multitude of signs
28. Snake swallowing a mouse
29. A river in Yellowstone Park washing away a road bank
30. A well-kept city park with tulips in bloom
31. Cypress knobs in water of Okeefenokee
32. A looking-up view of city sky scrapers
33. View of a housing project being constructed -- much soil exposed
34. Boa constrictor crushing a rabbit
35. View of empty parking area of a large shopping center
36. Sand dunes, salt grass, and palmetto: Florida Keys
37. Snake eating a frog
38. Basket of citrus fruit
39. A clear stream flowing over a dam
40. Desert in White Sands, New Mexico showing clumps of grass and shrubs
41. Aerial view of Atlanta Freeway System
42. Egrets off Cape Hatteras, North Carolina
43. Sea gulls on the beach
44. Street scene showing cluttering, telephone poles, and signs
45. White ducks swimming in the water
46. Live dunes at Cape Lookout (outer banks)
47. Golden Club (Orontia in Okeefenokee)
48. Earth-rise taken from the Moon
49. Egrets in trees in Everglades
50. Housing apartment project, with wood piles scattered, dirt exposed

51. Grassy area in woods, trillium, ferns, and beer cans
52. Cypress trees in Everglades
53. Aerial view of rail yards
54. Salt marshes of the Georgia Coast
55. Ghetto house: garbage and old car visible
56. Dead-end road full of garbage
57. Wild honey suckle (in bloom)
58. Ranch building in Los Verdis Forest, Colorado
59. Wiid turkeys in the forest
60. Aerial view of Tennessee River in Chattanooga
61. Big Horn Sheep in Rockies
62. Abandoned house in wooded area: garbage visible
63. Mountain stream with rocks and woods
64. Garbage dump beside road in Cumberland Cap, N.P.
65. Geese in parks
66. Alligator in swamp (Everglades)
67. Ghetto apartment with garbage
68. Astronaut walking on the Moon
69. Metal sculpture at entrance of Fulton Industrial Park, Atlanta
70. Cleared area in woods in Virginia with trees burning
71. Housing project on California beach showing pollution of ocean
72. Termites in a log
73. Aerial view of the Alps
74. Aerial view of Badlands on Yellowstone River near Glendive, Montana
75. Tiger swallowtail on a chrysanthemum

76. Split rail fence in a snow at Pea Ridge Battlefield
77. A spider feeding on a fly
78. A cat and rabbit feeding together
79. Crowded freeway traffic
80. White tailed deer feeding in the winter
81. Rock formation in Los Verdes National Forest
82. Elk herd in the Grand Tetons National Park
83. Aerial view of burning on the Granite slope of a mountain
84. Close up of badly polluted streem bank
85. Grand Canyon Pack Trail
86. Western forest being naturally reforested
87. An owl holding a dead white mouse
88. A littered city street
89. A wren feeding its young in a nest
90. Stalagtites in Mammoth Caves
91. A car junk yard near Bettesburg
92. A mountain view in Colorado
93. Littered roadside under the Arch in St. Louis
94. Saquaro Cactus growing on a desert hillside
95. A shrub growing out of solid rock
96. Devils Golf Course, Death Valley National Monument
97. Battleship Rock formation, Utah
98. Water standing in a strip mine
99. Aerial view of a suburban sprawl
100. Young hemlock in the mountain snow

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